TRANSPORTATION & COMMUNICATIONS - VISUAL OMNI RANGE - SPECIFICATIONS & DRAWINGS 15

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

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ERECTION OF TYPE "S" PREFABRICATED STEEL SECTIONAL BUILDING

Table of Contents

	Title	Page
I	Scope	1
II	Size of Building	1
III	Clearing and Grubbing	1
IV	Excavation	1
V	Backfill & Grading	2
VI	Concrete Foundation and Floor	2
VII	Erection of Building	4
VIII	Electrical	6
IX	Painting	7
X	Specifications	8

I SCOPE: This specification covers the requirements of the Civil Aeronautics Administration for the erection of Type "S" prefabricated sectional steel frame buildings. The buildings, exclusive of floor and foundation, will be furnished by the Government and such additional items as listed in the Invitation for Bids. Unless otherwise specified in the Invitation for Bids, the contractor shall furnish all material, labor, tools, equipment, water, power, light, heat transportation and other facilities necessary to complete the building as specified herein and shown on the drawings.

II SIZE OF BUILDINGS: The size of building furnished will be specified in the Invitation for Bids.

III CLEARING AND GRUBBING: Clearing and grubbing shall conform to the requirements set forth in the general specification governing the installation of the station or facility.

IV EXCAVATION:

(a) All vegetation, brush, shrubs, and other perishable matter shall be removed from the area to be occupied by the building. Excavation shall be of size required for the work, including space for forms and bracing, and shall be carried to the depth as shown on the drawings, or to a depth below the frost line, whichever is greater, unless specified otherwise in the Invitation for Bids. Where the character of the material excavated is such that it can be trimmed to the required lines for footings, the same will be permitted when approved by the Government's representative in charge. No backfill will be allowed under footings due to excavating deeper than required depths. Such excavations shall be filled with gravel or concrete at no extra charge to the Government. Excavations shall not be made unduly long before the concreting is to start. Water shall be removed from all excavations and the same shall be kept dry while pouring of concrete.

(b) No additional compensation will be allowed for excavation in rock or frozen earth, or for necessary sheeting, shoring, pumping, or draining, unless specifically provided for in the invitation for bids. When sound rock is found in excavating for the building foundation, it will not be necessary to excavate to the depth shown on the drawings. Excavation need only be deep enough to provide solid bearing on the rock which shall be free of seams, freed of loose material, cleaned and cut to a firm surface, either level, stepped vertically or serrated.

V BACKFILL AND GRADING:

(a) After foundation forms are removed, trenches shall be backfilled, both sides of the wall with suitable clean material taken from the excavation. Backfill shall be deposited in layers not over 12 inches thick and shall be thoroughly compacted by tamping.

(b) When drawings require wall supporting type concrete floors and compacted fill is used in lieu of forms, fill shall be clean material taken from the excavations or sand, cinders, gravel, slag or other approved fill.

(c) Clean material taken from the excavations shall be evenly spread around the foundation so as to bring the surface to the required grade. Grading shall be done as shown on the drawings and shall have a gradual slope away from walls of the building to assure proper drainage. A gravel eaves drip shall be provided on four sides of the building and shall extend approximately two feet from the foundation wall. Excess excavated material shall be placed on the site as directed by the Government's representative.

VI CONCRETE FOUNDATION AND FLOOR:

(a) Concrete:

(1) Description: Concrete shall conform to Civil Aeronautics Administration Specification CAA-566, Class I. No concrete shall be mixed or placed except in the presence of a duly authorized inspector of the Civil Aeronautics Administration, and the contractor or his agent shall give the inspector due and ample notice when mixing is to be commenced.

(2) Care of Concrete: Immediately upon removal of forms, all minor voids shall be neatly filled with cement mortar; irregularities in exposed surfaces shall be removed, and minor imperfections finished to the satisfaction of the Government's representative. Excessive or extensive honeycomb shall be cause for rejection. The contractor shall protect all concrete

against injury and weather and keep it warm, moist, and shielded from the direct rays of the sun for at least six days after pouring.

(b) Reinforcing Steel: Reinforcing steel shall conform to Federal Specification QQ-B-71 and shall be twisted or deformed bars Grade 2 or better. All reinforcement shall be inspected and checked in place and approved by the Government's representative in charge before concrete is poured. Reinforcing steel shall be supported in position by metal chairs or other approved methods and shall be accurately spaced and secured to prevent displacement during the pouring of the concrete. Reinforcing steel shall be free from excessive rust and scale. Bars and mesh shall overlap at joints sufficient to maintain uniform strength.

(c) Concrete Foundation Walls and Footings: Concrete foundation walls and footings shall be at least as large as shown on the drawings and shall be poured directly on undisturbed ground. At sloping building sites, footings may be stepped when the rise exceeds two feet. Foundation walls bearing on rock, if at a depth less than the minimum shown on the drawings, shall be bonded to the rock with 3/4-inch diameter reinforcing steel dowels spaced four feet apart. Dowels shall be grouted in drilled holes at least 18 inches into the rock and project at least 12 inches into the foundation concrete. Rock surface shall be cleaned of all dirt, dust, or other material and flushed with neat Portland cement mortar before pouring concrete.

(d) Anchor Bolts: Anchor bolts and pipe sleeves shall be placed in the foundation for securing the building in place. Anchor bolts shall be kept true and plumb during the pouring of concrete and maintained so until the concrete has taken its final set. The anchor bolts shall be accurately centered in the pipe sleeves by wrapping with oakum or other material that can be removed when wall panels are put in place.

(e) Conduits: All conduits that extend through the concrete shall be properly and accurately located before the placing of the concrete, and shall be supported to maintain the correct position during pouring of concrete, so that vertical extensions coupled to their ends are plumb. Appropriate recesses for power, control, and other conduits extending vertically from cabinets, etc., must be provided in the foundation wall. Location, space, depth, etc., shall be in accordance with the applicable drawings. Open conduit ends shall be protected from dirt, concrete, etc., by caps or temporary plugs of oakum.

(f) Concrete Floor and Steps: Concrete floor and steps shall be of the size as shown on the drawings and each shall be poured monolithically (not by base and topping method). Concrete floor shall be poured on forms or backfill at the contractor's option. Floor shall be finished with a steel trowel so as to produce a smooth durable surface, free from hair cracks and of good wearing quality. There shall be no point where the space between the floor and a 10-foot straight edge is more than 1/8 inch. In the event a satisfactory finish is not obtained during the finishing, the contractor will be required to rub the surface with a stone until a satisfactory finish is obtained.

VII ERECTION OF BUILDING:

(a) Building Description: The building furnished by the Government is a completely prefabricated sectional steel frame fire-resisting building exclusive of foundations, floors, conduit and electrical material. The size of the building and the panel arrangement is shown on the drawings furnished with the Invitation for Bids. These drawings also include details, piping, and electrical layouts and show equipment and fixtures to be installed. Panels are constructed of metal frames covered with tempered masonite, backed at certain points with cross members and spacers.

(b) Care and Protection: Prior to, and during erection, until a watertight roof has been obtained, all parts of the building must be protected from rain and snow. The contractor shall provide such storage, as is necessary to keep building materials and equipment dry and prevent damage. Covering by paulins will not be considered satisfactory storage. If the building is received in a damaged condition from the common carrier, the contractor shall note such condition on the Government's bill of lading. If the building is received in a damaged condition after storage by the Government, such condition shall be pointed out to the Government's representative in writing at the time the building is taken over. Shortages shall be similarly handled. The contractor must exercise care in handling, sorting, and erecting building panels to avoid damage. If any panels becomes damaged or soiled, the contractor shall repair or clean such panels at his own expense.

(c) Bolting and Weatherproofing:

(1) Wall Panels: Wall panels shall be erected by placing over foundation anchor bolts and bolting panels to each other in the following manner: First place two continuous beads of caulking compound (from a caulking gun) one on each side of foundation anchor bolts, and set panel in place but do not draw down bolts. Place two continuous beads of caulking compound on one vertical edge of the erected panel and proceed to place the next panel. Bolt adjacent panels together. Before erecting corner panels, reverse eleven (11) carriage bolts in the panel so that heads are on the inside. This should be done with the panel in a horizontal position so that the spacers between the panel boards do not become dislodged. The threshold strap in the door panels must be secured to the foundation by three lag screws. After all wall panels are erected and bolted together, draw anchor bolts down uniformly. Before caulking the outside joint of the wall panel to foundation wall the concrete shall be primed with thinned varnish or thinned oils and allowed to dry. Caulking shall be applied with a caulking gun. Exterior surface of panels shall be inspected for possible water leakage and properly caulked. Remove excess caulking compound so as to present a neat-watertight joint.

(2) Roof Trusses: One of two type of roof trusses will be furnished and shall be erected in accordance with the applicable erection drawings.

(3) Roof Panels: In erecting roof panels, place panels on roof trusses, applying two beads of caulking compound to edge of one panel and bring adjacent panel into position. In placing roof battens, first apply

caulking compound to the under side of the batten between bolt holes and the outer edge. Apply compound to the under side of lead washers and bolt head and draw bolts up sufficiently to form a tight joint but not enough to deform battens. Fill ridge with insulation and apply ridge cap with caulking compound and screw in place. Caulk under eaves. Remove excess caulking compound so as to present a neat watertight job.

(4) Additional Drilling, Etc.: The prefabricated parts have been carefully designed, checked and inspected but may require some drifting and additional drilling for battens, etc., to meet varying conditions. Any such work shall be performed by the erection contractor without additional compensation. Unnecessary drilling of holes, etc., through the panels or the metal work will not be tolerated and drilling shall be done only after approval by the Government's representative.

(5) Insulation: To complete insulation of building, pack space between top of wall panels and roof panels with rock wool; also pack handholes with rock wool before installing wall battens.

(d) Backing: Provide wood backing for service racks, clevises, or elsewhere as shown on the drawings. Backing shall be placed in outlooker before installing the outlookers on the buildings.

(e) Inside Battens: Inside battens shall be installed in the prescribed manner and upon completion shall be firm true to line, neat appearing and present a workmanlike job in all respects.

(f) Roof Ventilator: When required by the drawings, a roof ventilator, furnished by the Government shall be installed in roof panels provided with suitable openings.

(g) Wall Louvers: When required by the drawings, wall louvers furnished by the Government shall be installed in panels as shown.

(h) Gable Louvers: Gable louvers furnished by the Government shall be installed where shown on the erection drawings.

(i) Hoods: When required by the drawings, outside hoods furnished by the Government shall be assembled and installed over gable louvers and engine air exhaust opening as shown on erection drawings.

(j) Air Duct: When required by the drawings an air duct shall be provided for the engine air exhaust; if listed in the invitation-for-bids, the Government will furnish the duct and the contractor shall assemble and install the same as shown on the erection drawing.

(k) Door Visor: The contractor shall assemble and install the knock down door visor furnished by the Government for each door.

(l) Door Stops: Bronze door stops of the hook and keeper type, furnished by the Government, shall be installed by the contractor. The keeper shall be installed, six (6) inches in from the outside edge of the door and on a level with the bottom angle of the panels, with brass through-bolts. The bumper and hook unit shall be installed on the lower angle of the panel, positioned so that the hook will engage the keeper when the door is open flat against the building. This unit shall be installed by drilling and tapping the angle. A 4x4 wood post shall be furnished and installed by the contractor for the attachment of the bumper when location and conditions so require.

VIII ELECTRICAL:

(a) General: The contractor shall furnish and install all electrical wiring and fixtures as shown on the drawings and specified herein. All work shall be in accordance with the National Electric Code and regulations of the local power company and municipality. Government furnished materials will be listed in the Invitation for Bids.

(b) Wire and Wiring: Wire shall be copper, rubber insulated for 600-volt service conforming to Federal Specification J-C-103. Type RW wire shall be used in conduit in floor slabs, under floors or where moist conditions are expected. The neutral or grounded wire in all circuits shall be a white wire in accordance with standard wiring practices. No wire shall be used which has been previously in service. All circuits and connections shall be tested before acceptance and all circuits shall be fully identified in the distribution cabinet.

(c) Conduit: Conduit enclosed in earth or concrete shall be zinc-coated steel in accordance with Federal Specification WW-C-581. All other conduits shall be either zinc-coated as specified above, or enamel coated steel in accordance with Federal Specification WW-C-571. Size of conduit shall be as shown on the drawings. When conduit size is not shown, it shall be in accordance with the requirements of the National Electric Code for the number and size of wires to be contained therein. Conduits above the floor shall be fastened securely to the building, but in such a manner that they may be removed easily in case it is desired to dismantle the building. Conduits for ceiling lights shall be fastened to the lower cord of roof trusses. All conduits terminating in switch boxes, distribution cabinets, junction boxes, etc. shall have 2 locknuts and a bushing.

(d) Outlet Boxes: Outlet boxes shall be in accordance with Federal Specification W-O-821, Class B-2e or Federal Specification W-O-806, class B-2a, whichever is applicable.

(e) Light Switches: Light switches shall be 10-ampere, 125-volt, toggle type, snap switch, conforming to Federal Specification W-S-896.

(f) Convenience Outlets: Convenience outlets shall be duplex, 15-ampere, 125-volt outlets, conforming to Federal Specification W-R-151, Type II.

(g) Lamp Receptacles (Holders): Lamp receptacles shall be porcelain or plastic conforming to Federal Specification W-L-142, Type V.

(h) Light Reflectors: Light reflectors shall be porcelain enameled steel, green outside, white inside, shallow dome approximately 12 inches in diameter or as specified on the drawings, with holder for porcelain socket.

(i) Heater Outlet: Heater outlet shall be 20-ampere, 250-volt, 3-wire, polarized twist lock type receptacle similar and equal to Hubbell No. 7310.

(j) Ground Rods: Ground rods shall be 8-feet long, 5/8 inch diameter, copper-covered steel conforming to Civil Aeronautics Administration Specification CAA-233. A ground rod clamp shall be furnished with each rod.

(k) The following equipment shall be furnished and/or installed by the contractor when required as specified on the drawings:

(1) Fused Entrance Switch - Type and rating as shown.

(2) Isolation Switch with Indicating Light - Unless otherwise specified, switch shall be 60-amperes, 240-volt, 4-pole, double through, non-fusible, quick break type. Indicating light shall consist of a ruby jewel similar to G. E. No. 2296 in No. 49491 plate mounted on G. E. box No. SP5800 or equal. Lamp receptacle shall be similar and equal to Hubbell pilot lamp receptacle No. 427, 120-volt service or, No. 428 for 240-volt service. The indicating light box shall be mounted on the right side of the isolation switch. If the operating handle prevents this location, it shall be mounted on top of the switchbox.

(3) Control Line Terminal Box - Type and size as shown.

IX PAINTING:

(a) Exterior Surface: Exterior surfaces of the building shall be painted one prime coat and two finish coats of paint except no paint will be required on factory painted, doors, louvers, air filters, hoods, and door visors. The prime coat shall be applied as soon after erection of the building as practicable so as to prevent damage from the weather. Walls shall be white. Roof including roof edges shall be International Orange unless the roof is to be air marked in which case it will be painted yellow and black as shown on the drawings. When specified, the station name shall be painted on each side of the roof in accordance with applicable drawings. Roof letters shall receive three coats of paint.

(b) Interior Surfaces: Interior of the building shall be painted one prime coat and one finish coat of paint except no paint will be required on factory painted doors, louvers, gable fans, electrical cabinets, air filters, and air ducts. Walls, ceiling (underside of roof) and trusses shall be painted white. The concrete floor shall be given a neutralizing treatment, but will not be painted unless specified in the Invitation for Bids.

(c) Paint: Paint and painting shall be in accordance with Civil Aeronautics Administration Specification CAA-567a.

X. SPECIFICATIONS: The following specifications are referred to in this specification:

FEDERAL SPECIFICATIONS

Steel Reinforcement	QQ-B-71
Building Wire	J-C-103
Enameled Conduit	WW-C-571
Zinc-Coated Conduit	WW-C-581
Electric Outlet Boxes	W-O-806
Electric Outlet Boxes	W-O-821
Electric Switchbox	W-S-896
Electric Receptacles	W-R-151
Lampholders	W-L-142

CAA SPECIFICATIONS

Ground Rods	CAA-233
Concrete	CAA-566
Painting	CAA-567a

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

Specification CAA-95
October 1, 1943
(Supersedes Issue of
September 15, 1941)

SPECIFICATION FOR DRIVEWAY

I. GENERAL: This specification covers the requirements of the Airways Engineering Division for the construction of a driveway which will support light vehicular traffic to and from air navigation facilities or elsewhere as specified in the invitation for bids. The driveway consists essentially of a single lane gravel surfaced access road with **parking** area at the building.

II. COLLATERAL SPECIFICATIONS: The following specifications shall form a part of this specification.

A. Federal Specifications:

QQ-C-806	Culverts; iron or steel, zinc-coated
SS-C-191	Cement; Portland
SS-C-201	Cement; Portland, high-early-strength
SS-A-281	Aggregate; (For) Portland cement concrete
TT-P-59	Paint; ready-mixed, international-orange
TT-P-40	Paint; oil, exterior, ready-mixed, light-tints, and white
TT-P-641	Primer; paint, zinc dust-zinc oxide (for galvanized surfaces)

B. Revised Specifications:

(1) The collateral specifications referred to herein are by basic number. The issue of the specifications including revision and addenda in effect on the date of the invitation for bids, insofar as applicable, shall apply.

(2) Federal Specifications are not furnished to bidders for the reason that they were prepared in collaboration with materials producers who are assumed to be familiar with their requirements. Copies of Federal Specifications may be obtained from the Superintendent of Documents, Washington, D. C., at the published rates.

III. DRAWINGS:

A. The following drawing shall accompany, and shall be made part of, this specification:

No. C-2107 Driveway Cross Sections

B. Blueprint Copies: Small scale lithographic reproduction of the drawing is furnished with the specifications and invitation for bids for the bidder's use in making up his quotations. Upon request, the successful bidder will be furnished with blueprint copies on a larger scale of the drawings from which the lithographs were made.

IV. CLASS: The driveway covered by this specification shall be of one class gravel surface.

V. MATERIAL AND WORKMANSHIP: The materials used in the construction of the driveway shall be as specified herein and shall be suitable for the intended purpose. If natural materials meeting the requirements of this specification are not available, suitable local materials may be mixed to produce a similar material and used in lieu thereof. Approved methods of construction shall be employed and the materials applied as specified. However, should local custom differ materially from that outlined herein,local methods may be used when approved by the contracting officer in writing.

VI. WORK TO BE PERFORMED BY THE CONTRACTOR: Unless otherwise specified, the contractor shall furnish all labor and material, including excavation, backfill, grading, clearing, tools and equipment, required to complete the work and deliver in place the driveway, complete, as shown on the drawing and the site plot plan. The Government engineer will set construction stakes establishing lines, slopes, grades, center line, and bench marks for culverts or other accessory structures as he may deem necessary. The contractor shall furnish the engineer such labor and stakes as he may reasonably require in establishing the necessary points and lines. The contractor shall be held responsible for the preservation of all construction stakes and marks, and if any such stakes or marks are destroyed or disturbed, the cost of replacing them shall be at the contractor's expense.

VII. DETAIL REQUIREMENTS:

A. Order of the Work: The contractor ordinarily will be required to build and surface the driveway at the beginning of the job in order that the subgrade and the surface may become compacted by hauling materials to the work, as well as for the contractor's own convenience of ingress and egress. The contractor shall therefore satisfactorily maintain the surface, shoulders, and ditches for the duration of the contract and before final acceptance shall fill ruts and generally rehabilitate and smooth the driveway so as to leave it in good condition for subsequent use of passanger vehicles and light trucks.

B. Clearing and Grubbing:

(1) The contractor shall do all clearing and grubbing necessary. This work shall include clearing the ground of all trees, fences, brush, shrubs, and other vegetation, and shall include the removal of all stumps, roots, pole stubs, brush, and debris necessary to insure a substantial subgrade. Unless otherwise specified, all merchantable or usable timber, fences, or firewood shall remain the property of the owner, and shall be piled as directed; fence wire shall be neatly coiled.

All brush and debris shall be piled and burned within the right of way, or otherwise disposed of, in accordance with local ordinances and regulations. The term "Clearing and grubbing" where mentioned in this specification shall be taken to mean only that clearing and grubbing is necessary for the construction of the driveway.

(2) The work of clearing and grubbing as outlined above will be paid for at the contract unit or job price. When there is no item of clearing and grubbing in the proposal, the contract unit prices for driveway excavation shall include full payment for clearing and grubbing.

C. Excavation and Grading:

(1) Cuts and fills shall be made to the line and grade shown on the plans or as staked by the Government's representative. Unsuitable subgrade materials, if any, shall be removed from the driveway and wasted by spreading uniformly over the areas adjacent to the driveway, or disposed of as directed. All suitable materials encountered in the excavation shall be used in the formation of the embankments, shoulders, and at such other places as shown or directed.

(2) The driveway will be so staked as to require a minimum amount of cut and fill, and in general, the necessary subgrade and shoulder material may be cast in place directly from the roadside ditches. If shown on the plans or ordered by the contracting officer, the contractor shall excavate and remove material from such points within the limits of the Government-owned or leased area as may be directed, and shall use such material at points in the driveway where required for embankments, etc.

(3) Ditches shall be excavated to lines and grade given by the Government's representative, to insure adequate drainage. Compaction of subgrade by traffic as much as practicable will be required prior to surfacing.

(4) All driveway excavation shall be unclassified, and shall consist of all materials encountered in the excavation. No excavation shall be made in solid rock unless authorized by the contracting officer in writing or by telegraph.

(5) The quantity of excavation to be paid for will be measured in excavation only, and will be the number of cubic yards of material removed from the completed and accepted excavation as computed by the average and area method. The contract unit price for driveway excavation shall be full compensation for the excavation, for hauling, for the formation and compaction of embankments, subgrade and shoulders, for the disposal of unsatisfactory and surplus materials, and for such clearing and grubbing as is not otherwise provided for in the proposal. There will be no direct payment for haul or overhaul. The use of rollers will not be required in compaction of embankments.

D. Borrow: Any quantity of material needed to complete the embankment, and which cannot be obtained from within the limits of the right of way for the driveway or from within the limits of the Government owned or leased area to which the driveway will lead, shall be classified as borrow and shall be paid for at the contract unit price for borrow. The amount of material used shall be measured in the same manner as driveway excavation.

The contract unit price shall be full compensation for furnishing, hauling, placing, and all other work necessary to complete the item. There will be no direct payment for haul or overhaul. No payment for borrow will be made unless authorized in advance and in writing by the contracting officer.

E. Surface:

(1) Unless otherwise specified, the driveway shall be surfaced with pit-run gravel, steam-bed gravel, broken stone, slag, shell, or other approved local material. Gravel, broken stone, or slag shall not exceed two inches in diameter, shall be reasonably well graded from coarse to fine with a maximum allowable 25 percent and minimum allowable 10 percent by volume of free clay or other approved binding material. If the coarse material does not contain particles less than 1/4 inch diameter in equal volume to the clay, then sand shall be added to produce this proportion of fines to clay. If natural material meeting the above specification is not available, suitable local materials may be mixed before spreading to produce a similar material. Loam will not be used as a binder. No compacting other than by traffic will be required except that subgrade will be compacted as much as practicable before surfacing. In this specification, it is not intended to ignore local practices, should local custom differ materially from that outlined above, local methods may be used when approved by the contracting officer in writing or by telegram.

(2) Surfacing material will be measured and paid for on the basis of truck or wagon body measurement before compacting. The contract unit price shall be full compensation for furnishing, hauling, placing, compacting, smoothing, and all other work necessary to complete the item. There will be no direct payment for haul or overhaul.

F. Parking Area: Unless otherwise directed, the parking area shall be surfaced the same as the driveway. It shall slope away from buildings at 1/4 inch per foot, or more. Ditches necessary to drain water away from buildings shall have side slopes of 4:1 whenever practicable. If called for in the proposal, concrete curb hereinafter specified shall be installed in accordance with applicable drawings. Expansion joints and drainage ducts in same shall be furnished and installed as required. Payment for parking areas will be made under the contract items for excavation, borrow, surfacing, etc. Curb will be paid for as hereinafter provided.

G. Culverts:

(1) Culverts shall be installed where shown on the location drawings, or as directed. Excavation for culverts shall be made to insure:

(a) A firm, uniform foundation for the culvert
(b) Maximum drainage provision
(c) Outlet and inlet ditches to the line and grade established by the Government's representative.

Unless otherwise directed, the cover over the culvert at the edge of the road metal shall be a minimum of one foot. Backfill around the culvert shall be well compacted in layers not exceeding six inches. Unless otherwise specified, culverts shall be corrugated galvanized sheet metal, full circle, conforming to Federal Specification QQ-C-806.

(2) The contract unit price for culverts shall include full payment for furnishing and installing in place all necessary pipe and material, and all excavation, backfill, compacting and all other work necessary to complete the item. Payment for inlet and outlet ditches will be made under the item of driveway excavation.

H. Concrete Curb and Headwalls: If called for in the proposal, concrete headwalls for culverts and/or concrete curb for the parking area shall be constructed in accordance with the details shown on the drawings.

(1) Concrete shall consist of one part cement, two parts fine aggregate, four parts coarse aggregate and sufficient water to produce a mix of approved working consistency. The proportioning of materials shall be by a method which shall assure the correct proportion by volume. Placing, spading, protecting, curing, and finishing (when specified) shall be by approved methods to obtain sound, dense concrete practically free from honeycomb, and true to the desired lines and form shown on the drawings. Cement shall conform to Federal Specification SS-C-201 or SS-C-191 for Portland cement or high-early-strength Portland cement respectively. Fine aggregate shall consist of natural or prepared stone sand free of clay and other deleterious substances, well graded from No. 100 to No. 4 sieve size. Coarse aggregate shall consist of clean, hard, dense, tough, durable fragments of stone or gravel free from soft, thin, elongated or laminated or disintegrated pieces, dirt, vegetable or other objectionable matter, and shall be well graded fine to coarse of No. 4 to 1-1/2 inch size material. Water shall be free of matter deleterious to concrete.

(2) The contract unit price for concrete curb or headwalls shall include full payment for excavation, forms, expansion material, weepholes or drainage ducts, concrete, materials, labor, etc.

I. Guard Posts: If called for in the proposal, guard posts of the type specified shall be installed in accordance with the drawings, Guard posts of galvanized steel pipe shall be painted a priming coat of zinc dust-zinc oxide galvanized iron primer meeting Federal Specification TT-P-641, followed by two coats of international orange at the top and bottom thirds of the posts, and three coats of outside white on the middle third. Wood guard posts shall be of approved locust, redwood, cypress, or short leaf pine, and shall be painted a priming coat of white, followed by two coats of international orange on the top and bottom thirds, and two coats of outside white on the middle third. The contract unit price for the guard post specified shall be full payment for the post in place, including excavation, backfill, tamping, and painting.

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DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

SPECIFICATION CAA-566
November 1, 1942

SPECIFICATION FOR CONCRETE

I. **SCOPE:** This specification covers the current requirements of the Civil Aeronautics Administration for concrete used in the construction of Federal Airways.

II. **CLASSES:** Two classes of concrete are considered. Class I shall be used unless Class II is specified in the invitation for bids.

Class I: For use in light or non-load bearing elements where design stresses are not specified.

Class II: For use in load bearing elements where predetermined design stresses are specified.

III. **MATERIALS:**

III-A. **Cement:** Cement shall conform to the requirements of Federal Specification SS-C-191 for "Cement; Portland", unless specified by the contracting officer. However, high-early-strength cement conforming to Federal Specification SS-C-201 may be substituted for Portland cement at the option of the contractor.

III-B. **Water:** Water shall be fresh, clean, and free from injurious amounts of oil, acid, alkali, salt, organic matter, or other deleterious matter. Brackish water, sea water, or water carrying sewage or manufacturing waste shall not be used.

III-C. **Aggregate:**

III-C1. **Fine:** Fine aggregate shall conform to the requirements of Federal Specification SS-A-281 for "Aggregate; Portland Cement Concrete" Class I, Grade A, suitable for use in concrete structures in general, except that the material shall be natural sand unless other inert material is specifically approved.

III-C2. **Coarse:** Coarse aggregate shall conform to the requirements of Federal Specification SS-A-281 for "Aggregate; Portland Cement Concrete" Class II, Grade A, suitable for use in concrete structures in general, except that the material shall be crushed stone, or gravel, unless other inert material is specifically approved.

III-D. Storage of Material: Cement and aggregates shall be stored in a manner to prevent deterioration or intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site of the project.

IV. PROPORTIONING:

IV-A. Class I: Concrete of this class shall contain the following proportion of ingredients:

Cement	Aggregate			Maximum
	Fine	Coarse		Gallons of Water
Parts	Parts	Parts	Size	per Sack of Cement
1	2	4	No. 4 to ¾ in.	6 1/2

Concrete of this class will be considered to have a compressive strength at the end of 7 days in excess of 1600 pounds per square inch and at the end of 28 days in excess of 2500 pounds per square inch. The amount of water specified is a maximum and should be reduced if moisture is present on the surface of the aggregate particles or if less water will produce a plastic mixture having the necessary uniformity and workability. In general, the consistency of any mix shall be that required for the specific placing conditions and methods of placement, and ordinarily the slump shall be between 3 and 5 inches, when tested in accordance with the current A.S.T.M. Specification C-143 for "Method of Slump for Consistency of Portland-Cement Concrete."

IV-B. Class II. The proportions of aggregate to cement for concrete of this class shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around the reinforcement with whatever method of placing is employed, without segregation of materials or collection of excess free water on the surface. The combined aggregates shall be of such combination of sizes that fine aggregate shall not be less than 30 percent nor greater than 50 percent by weight of the total, unless otherwise specified by the Contracting Officer. The strength quality of the materials proposed for use shall be established by tests prior to the beginning of operation, using consistencies suitable for the work and in accordance with A.S.T.M. Specification C-39 for "Method of Test for Compressive Strength of Concrete." A curve representing the relation between the water content and the average 28-day compressive strength shall be established for a range of values including the strength called for in the invitation for bids. The curve shall be established by at least 4 points, each representing the average value from at least 4 test specimens. The water content used in the concrete, as determined from the curve, shall correspond to a strength which is 20 percent greater than that called for in the invitation for bids, for concrete of compressive strength less than 2500 pounds per square inch and 15 percent greater for concrete of compressive strength of 2500 pounds per square inch or more.

V. MIXING:

V-A. MECHANICAL MIXING:

V-A1. General: The mixing equipment shall be capable of combining the cement, aggregates, and water into a thoroughly mixed and uniform mass within the specified time, and of discharging the mixture without segregation.

V-A2. Plant Mixing: The plant mixer shall be of adequate size to accommodate the maximum batch. It shall be of a type which will insure a uniform distribution throughout the mass. The equipment shall be such that all materials (including water) entering the drum can be accurately proportioned. The mixer drum shall rotate at an angular speed greater than 4 rpm and a peripheral speed less than 225 feet per minute. The batch shall be so charged into the mixer that some water shall enter in advance of the cement and aggregate and shall continue to flow for a period which may extend to the end of the first one-third of the specified mixing time. The mixing period shall extend from the time all solid materials are in the mixer. The minimum mixing time shall be as follows:

(a) Mixers of a capacity of one cubic yard or less - one minute

(b) Mixers with a capacity greater than one cubic yard - one minute plus 30 seconds for each cubic yard, or fraction therof, additional capacity.

The mixing time specified above may be shortened when plant mixed concrete is to be transported by agitator truck. In this case the minimum mixing time shall be as follows:

(c) Mixers with a capacity of one cubic yard or less - one minute

(d) Mixers with a capacity greater than one cubic yard--one minute plus 15 seconds for each cubic yard, or fraction thereof, additional capacity.

V-A3. Truck Mixing: Truck mixers shall be of the revolving drum type, watertight, and so constructed that concrete can be mixed to insure uniform distribution of materials throughout the mass. All solid materials shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided for, the truck mixer shall be equipped with a tank for carrying mixing water. The water shall be placed in the tank at the proportioning plant and shall be measured, unless the tank is equipped with an automatic measuring device. The mixing water may be added directly to the batch, in which case a tank will not be required, if the concrete is delivered and discharged within a period of 1½ hours after introduction of the mixing water to the cement and aggregates. The maximum size of batch shall be in accordance with the rated capacity of the mixer.

Each batch shall be mixed not less than 50 nor more than 150 revolutions of the mixer, at the rate of rotation recommended by the mixer manufacturer, after all ingredients are in the drum. Additional mixing shall be at agitating speed of not less than two nor more than six rpm of the drum. Mixing shall start within 15 minutes after cement has been added either to water or aggregate.

V-A4. Partial Plant Mixing: When a truck mixer, or an agitator provided with mixing blades, is used for transportation, the mixing time at the plant may be reduced to 30 seconds and the mixing completed, in the truck mixer or agitator. Mixing shall be as specified for agitating speed in paragraph V-A3.

V-B. Hand Mixing: When hand mixing is authorized, it shall be done on a watertight mixing board in such a manner as to insure a uniform distribution of materials throughout the mass. The mixing board shall be set level and securely blocked up so that the board will not sag under the weight of concrete, and so that cement grout will not run off the one side. The fine aggregate shall be spread on the mixing board in a layer three to four inches thick. Cement shall be spread as evenly as possible on the fine aggregate. Shovels shall be used to turn aggregate and cement in such a way that the materials will be thoroughly mixed. The mass shall be turned until it is of a uniform color with no streaks of either aggregate or cement but, in any event, not less than two times. The mixture shall then be spread in a layer and the coarse aggregate added. The batch shall then be soaked with about one-half to three-quarters the required quantity of water, care being taken not to wash away any of the cement. The materials shall then be turned over, the mixing continuing until the mass is uniform, water being added to dry spots during mixing until the required amount has been added. After the final turning, the mass shall be shoveled into a compact pile, before being shoveled into forms, or vehicles for conveying to forms.

V-C. Retempering: The retempering of concrete which has partly hardened, that is, mixing with or without additional cement, aggregate or water, will not be permitted.

VI. FORMS:

VI-A. General: Forms shall conform to the shape, lines, grades, and dimensions of the concrete as called for on the drawings and specifications. Lumber used in forms for exposed surfaces shall be dressed to uniform thickness and shall be free from loose knots or other defects. Joints shall be horizontal or vertical where appearance of the finished surface is of importance. For unexposed surfaces and rough work, undressed lumber may be used. Lumber once used in forms shall have nails withdrawn, and surfaces to be in contact with concrete thoroughly cleaned before using again.

VI-B. Construction: Forms shall be sufficiently tight to prevent leakage of cement. They shall be properly braced or tied together to maintain the desired position and shape during and after placing concrete. In case of long spans where no intermediate supports are possible, the deflection in forms due to the weight of fresh concrete shall be taken into account so that the finished members shall conform accurately to the desired line and grade. Where directed, or called for on the drawings, moldings or bevels shall be placed in the angles of forms to round or bevel the edges of the concrete. Unless otherwise specified, forms shall be metal, plywood, or dressed lumber.

VI-C. Treating: The inside of forms shall be coated with non-staining mineral oil or other approved material or, in the case of wood forms, the shall be thoroughly wetted. Where oil is used, it shall be applied before the reinforcement is placed.

VI-D. Inspection: Temporary openings shall be provided at the bases of columns, wall forms, and at other points where necessary to facilitate cleaning and inspection immediately before depositing concrete.

VI-E. Form Removal: The removal of forms shall not be started until the concrete has attained the necessary strength to support its own weight and any construction live loads, and not until permission has been given by the inspector.

VII. PLACING AND PROTECTION:

VII-A. Preparation: Before beginning the placement of concrete all hardened concrete and foreign materials shall be removed from the inner surfaces of the mixing and conveying equipment. Before depositing concrete, all debris shall be removed from the space to be occupied by the concrete. Forms shall be thoroughly oiled or wetted. Reinforcement shall be secured in position and approval of inspector attained before concrete is placed. Unless otherwise directed by the inspector, water shall be removed from the space to be occupied by the concrete before concrete is deposited. Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other methods which will avoid washing the freshly deposited concrete. When directed by the inspector, vent pipes and drains shall be filled by grouting or otherwise after the concrete is hardened.

VII-B. Handling: Concrete shall be handled from the mixer, or in the case of ready-mixed concrete, from the transporting vehicle, to the place of deposit as rapidly as practicable by methods which will prevent the separation or loss of ingredients. Under no circumstances shall concrete which has partially or or completely hardened be deposited in the work.

VII-C. Depositing: Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling. It shall be deposited to maintain, until the completion of the unit, a plastic surface approximately horizontal. Forms for walls or other sections of considerable height shall be provided with openings or other devices that will permit concrete to be placed in a manner which will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the level of the concrete. Concrete shall be deposited continuously, or in layers of such thickness, that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points approved by the inspector. The temperature of concrete when deposited shall be not less than 50 degrees F. nor more than 120 degrees F

VII-C1. Cold Weather Depositing: In freezing weather suitable means shall be provided to maintain the concrete within the temperatures specified until thoroughly hardened. Before placing concrete, the forms shall be protected on all sides by straw, tarpaulins, or other means. Methods of heating and protecting shall be approved by the inspector. Salts, chemicals, or other foreign materials shall not be mixed with concrete to prevent freezing.

VII-D. Chuting: When concrete is conveyed by chutes, the equipment shall be of such size and design to insure continuous flow. Chutes shall be of metal or metal lined. The slope shall be not less than one vertical to two horizontal. The discharge end shall be provided with a baffle plate to prevent segregation. If the distance of the discharge end of the chute above the surface of the concrete is more than three times the thickness of the layer being deposited, but not more than five feet, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When operation is intermittent, the chute shall discharge into a hopper. The chute shall be thoroughly cleaned before and after each run and any debris and water shall be discharged outside the forms.

VII-E. Pumping: Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be suitable and adequate in capacity. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipe line, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or segregation of the ingredients. After this operation, the entire equipment shall be cleaned.

VII-F. Compacting: During and immediately after depositing, the concrete shall be compacted by means of suitable tools. At inaccessible places, where spading, rodding, or forking is impracticable, the concrete shall be worked into place by vibrating, or hammering the forms lightly. The concrete shall be thoroughly worked around reinforcement, around imbedded fixtures, and into corners. Accumulations of water on the surface of the concrete due to water gain, segregation, or other causes, during placement and compacting, shall be prevented as much as possible by adjustments in the mixture. Provision shall be made to remove such water as may accumulate so that under no conditions will concrete be placed in such accumulations. When mechanical vibration is used, the number and type of vibrations shall be subject to the approval of the inspector.

VII-G. Bonding: Before depositing new concrete on or against concrete which has hardened, the forms shall be retightened. The surface of the hardened concrete shall be roughened in a manner that will not leave loosened particles of aggregate or damaged concrete at the surface. It shall be thoroughly cleaned of foreign matter and saturated with water. To insure an excess of mortar at the juncture of the hardened and newly deposited concrete, the cleaned and saturated surfaces shall be covered with a coating of mortar or neat cement grout against which the new concrete shall be placed before the grout has attained its initial set.

VII-H. Protection: All concrete placed under this specification shall be so protected that the temperature at the surface will not fall below 50 degrees F., or that there will be no appreciable loss of moisture from the surface for the period as indicated below.

1. Portland Cement - seven days
2. High-early-strength Portland Cement - three days

The contractor shall submit for approval of the inspector the methods he proposes to use for protecting the concrete against low temperatures. These requirements concerning the temperature at the surface is intended to apply to placing of concrete in those seasons of the year, or in such places where the possibility of freezing or continued low temperatures is to be expected. They are not intended to apply where temperatures below 40 degrees F. are a rarity. In any case, concrete must be protected during the first 72 hours where Portland cement is used, or 24 hours where high-early-strength Portland cement is used.

VIII. APPLICABLE SPECIFICATIONS:

VIII-A. Federal Specifications: Federal Specifications are referred to by basic number. The issue of Federal Specifications, including revisions and addenda in effect on date of invitation to bid, shall apply. Federal Specifications are not furnished to bidders for the reason that they were prepared in collaboration with materials producers who are assumed to be familiar with their requirements. Copies of Federal Specifications may be obtained by bidders and others from the Superintendent of Documents, Washington D.C., at the published rates.

APPLICABLE SPECIFICATIONS

SS-C-191	Cement; Portland
SS-C-201	Cement; Portland, high-early-strength
SS-A-281	Aggregate; Portland Cement Concrete

VIII-B. Commercial Specifications: The following American Society for Testing Materials Specifications are applicable to this specification. Copies may be obtained from the American Standards Association, 29 West 39th Street, New York, at published prices.

ASTM C39	Compressive strength of concrete, Method of Test for
ASTM C143	Consistency of Portland-Cement Concrete, Slump Test.

IX. OPTIONS: In using this specification, contracting officers should take special care to exercise all options. Options to be considered are as follows:

PARAGRAPH	OPTION TO BE SPECIFIED
II	Class if other than Class I.
III-A	Kind of cement if other than specified
III-C1	Approved inert material if other than natural sand.
III-C2	Approved inert material if other than crushed stone or gravel.
IV-B	Percentages of aggregates if other than specified.
VI-B	Type of forms if other than specified

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DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

Specification CAA-567d
December 30, 1952
(Supersedes Issue of
August 1, 1951)

SPECIFICATION FOR PAINTING

Paragraph	Subject	Paragraph	Subject
1.	Scope	4.	Sampling, Inspection and Testing
2.	Applicable Specifications	5.	Notes
3.	Requirements		

1. SCOPE: This specification covers the requirements of the Office of Federal Airways for painting structures and equipment.

2. APPLICABLE SPECIFICATIONS: The following Federal specifications, of the issue in effect on date of invitation for bids, form a part of this specification:

NAVY	Bituminous Coating of Steel Surfaces
JAN-P-735	Primer; Paint, Zinc-Chromate, Alkyd-Type
TT-A-468	Aluminum-Pigment; Powder and Paste for Paint
TT-C-595	Colors for Ready-Mixed Paint
TT-D-651	Drier; Paint, Liquid
TT-E-487	Enamel; Floor and Deck
TT-E-489	Enamel; Gloss, Synthetic (for Exterior and Interior Surfaces)
TT-E-508	Enamel; Interior Semi-Gloss Tints and White
TT-O-364	Oil; Linseed, Boiled (for Use in Organic Coatings)
TT-O-371	Oil; Linseed-Replacement (for Use in Organic Coatings)
TT-O-369	Oil; Linseed; Raw (for Use in Organic Coatings
TT-P-18	Paint; Alkyd Resin-Emulsion, Exterior, Paste, Tints and White
TT-P-25	Paint, Exterior-Prime, Ready-Mixed, Light Tints and White
TT-P-51	Paint; Oil, Interior, Flat, Wall, Tints and White
TT-P-56	Paint; Primer-Sealer, (for Plaster and Wallboard)
TT-P-61	Paint; Ready-Mixed, Black
TT-P-86	Paint; Red-Lead Base, Ready-Mixed
TT-P-91	Paint; Rubber-Base (for Cement Floors)
TT-P-102	Paint; (Titanium-Lead-Zinc and Oil, Exterior

TT-P-103	Paint; (Titanium-Zinc and Oil, Exterior, Fume-Resistant, Ready-Mixed, White)
TT-P-636	Primer-Paint; Synthetic (for Ferrous Metal & Wood Surfaces)
TT-P-641	Primer-Paint; Zinc Dust-Zinc Oxide (for Galvanized (Zinc Coated) or Zinc Surfaces)
TT-P-781	Putty and Elastic-Compound; (for Metal-Sash-Glazing)
TT-P-791	Putty; Pure Linseed Oil (for Wood Sash Glazing)
TT-R-191	Red-Lead; Dry and Paste-In-Oil
TT-S-711	Stain; Wood, Interior, Non-Bleeding
TT-T-306	Thinner; Synthetic Enamel
TT-T-291	Thinner, Paint, Volitile Mineral Spirits (Petroleum Spirits)
TT-T-801	Turpentine; Gumspirits & Wood (Steam Distilled & Sulphate) (For Use in Organic Coatings)
TT-V-71	Varnish; Interior, Floor and Trim
TT-V-81	Varnish; Mixing (for Aluminum Paint)
TT-V-91	Varnish; Shellac

3. REQUIREMENTS:

3.1 Surface Preparation.- Surfaces shall be smooth, clean, free from grease, dirt, rust, scale, and thoroughly dry when paint is applied. Painted surfaces shall have all loose paint removed, high gloss reduced, and the surface made reasonably smooth by sanding, scraping, sandblasting, flame cleaning or other suitable means.

3.1.1 Metal Surfaces.- All rust and loose scale shall be removed by sanding, wire brushing, flame cleaning or sand blasting. Grease, oil or flux shall be removed by washing with a suitable volatile solvent. An approved galvanized breakdown treatment is required on galvanized surfaces prior to painting unless the prime paint is zinc dust-zinc oxide.

3.1.2 Wood Surfaces.- Wood surfaces shall be prepared for painting to a condition consistent with their intended appearance, purpose, and material finish; e.g., sanded or planed wood surfaces shall have skips sanded or otherwise smoothed to conform to the appearance of the remainder of the piece; all boards shall be freed of loose splinters removed and peavy, pike, or spike marks sufficiently cleared to permit paint to reach all surfaces of the pole. Knots and sappy streaks shall be given a thin coat of resin-free orange shellac varnish prior to painting. Where resin has exuded from the wood and formed beads on the surface or has caused paint to alligator, the area shall be scraped and sanded until the resin and/or paint is removed and then washed with turpentine prior to applying the shellac varnish sealer.

3.1.3 Interior Trim (Painted).- Door and window casings, mullions, and interior battens shall be sanded to remove edges left by sanding machines or planing mill before priming coat is applied. After the priming coat is dry, all nail holes, cracks, and other cavity imperfections shall be filled with putty or other suitable filler to present a flush and smooth surface for succeeding coats of paint.

3.1.4 Interior Trim (Stained).-Where stain and varnish is specified for interior woodwork, the woodwork shall be sanded to remove edges left by sanding machines or planing mill before stain is applied. Stain shall be applied in such a manner that the finish shall be the color specified. All nail heads shall be sunk below the surface and the holes filled with stained pointing compound. After the stain and pointing compound is dry, (at least 8 hours), the first coat of varnish should be applied. Unless otherwise specified, three coats of varnish shall be applied, the surface being sanded lightly between coats with 4-0 sandpaper. Each coat shall be allowed to dry at least 24 hours before the surface is sanded and prepared for the next coat. The finish coat shall not be sanded.

3.1.5 Preservative Treated Wood.- Both oil and salts preservative treated wood should be allowed to dry as long as possible before painting. Pressure pentachlorophenol treated wood should be allowed to dry about one year before painting. Salt treated wood may be successfully painted when the surface is dry and the wood excess moisture is gone. Oil preservative treated wood shall be given two sealer coats of aluminum paint (two pounds of aluminum pigment to the gallon of mixing varnish) prior to the color coats. On heavy treated wood, it is advisable to allow the aluminum sealer coats about 30 days exposure in hot weather to test the effectiveness of the sealer before applying the color coats.

3.1.6 Masonry and Concrete.- Masonry surfaces shall be cleaned by brushing with a wire brush to remove loose mortar, efflorescence, or other foreign substances. All damaged mortar shall be pointed with new mortar before paint is applied. Undue roughness on concrete surfaces shall be removed by rubbing with carborundum brick or other suitable means before paint is applied. Masonry and concrete surfaces shall be given a neutralizing treatment with a solution made by dissolving two (2) pounds of magnesium flucsilicate in a gallon of water. Allow surface to dry at least 48 hours after applying the neutralizing treatment. When dry, thoroughly brush with a broom or fiber brush to remove dust and crystals that form on surface. Masonry and concrete should be allowed to age at least six (6) months before painting.

3.2 Application.-

3.2.1 Methods.- Paints shall be applied uniformly in the proper consistency only by skilled painters. Brush or spray methods of application will be satisfactory unless otherwise specified. Ample drop cloths shall be used at all times. Division lines between colors shall be sharply defined. All coats of paint shall be free from sags, wrinkles, runs, holidays, smears, dirt, and colors other than those specified. No abrasives of any kind shall be used to remove paint from glass or porcelain enameled surfaces.

3.2.2 Weather Precautions.- No painting shall be done in cold, damp, frosty, dusty or rainy weather, or when forecasts indicate such weather conditions within the next 48 hours. Painting may be done in winter if care is taken to choose periods when the weather is clear and the temperature is favorable (not lower than 50° F.), and the surfaces dry.

3.2.3 Stirring.- Paint shall be thoroughly stirred before painting and stirred frequently during application to assure proper mixing of the pigment and vehicle. If necessary, paint shall be strained before using.

3.2.4 Coloring Undercoats.- When directed by the inspector or specified, a small amount of color pigment shall be mixed into prime and body paint before application to aid visual inspection and reveal imperfect coverage.

3.2.5 Number of Coats.- The number of coats of paint and the colors as specified on drawings, specifications or the invitation for bids shall be applied. Unless otherwise specified, new surfaces exposed to the weather shall be given three coats of paint and interior surfaces two coats of paint. In repainting old work, omit the prime coat of paint and apply two (2) coats on exterior surfaces and one (1) coat on interior surfaces.

3.2.6 Drying Time.- Each coat of paint shall be given ample time to dry and harden before the next coat is applied. The minimum drying time under favorable conditions for paint on wood or masonry surfaces is two (2) days and on metal surfaces is four (4) days.

3.3 Additions to Ready-Mixed Paint.-

3.3.1 Thinning.- Ready-mixed paints shall be thinned for prime and body coats in accordance with the manufacturer's directions printed on the containers. Mixing of thinner into the paint shall be performed in the presence of the inspector. In absence of specific manufacturers thinning directions, the following additions shall be made:

3.3.1.1 Priming Coats.-

3.3.1.1.1 Lead-In-Oil Paints.- Add one pint of raw linseed oil to the gallon of paint for wood surfaces. Add one-half to one pint of turpentine to the gallon of paint for metal and tempered Presdwood surfaces.

3.3.1.1.2 Zinc Dust-Zinc Oxide Primer.- Use as received or if necessary, add not more than one pint of turpentine or mineral spirits to the gallon of paint.

3.3.1.1.3 Floor and Deck Enamel.- Add one quart of thinner, (2/3 boiled linseed oil and 1/3 turpentine) to the gallon of paint for wood surfaces. Add one quart of thinner (2/3 spar varnish and 1/3 turpentine) to the gallon of paint for concrete surfaces.

3.3.1.1.4 Rubber-Base Paint.- Thin with 1 part thinner (Synthetic-Enamel Thinner, Federal Specification TT-T-306) to 4 parts paint.

3.3.1.2 Body Coats.-

3.3.1.2.1 Lead-In-Oil Paints.- Use as received, or if necessary add not over one-half pint of turpentine or mineral spirits to the gallon of paint.

3.3.1.2.2 Varnish-Base Paints.- Use as received, for concrete surfaces. Use as received, or if necessary add not over one pint of boiled linseed oil to the gallon of paint for wood surfaces.

3.3.1.2.3 Rubber-Base Paint.- Use as received.

3.3.1.2.4 Interior-Semi-Gloss Enamel.- Use as received.

3.3.1.2.5 Synthetic Gloss Enamel.- Use as received.

3.3.2 Anti-Mildew Additive.- When specified, a fungicide similar to "Nuodex 321 S.S.", manufactured by Neodex Products Company, Inc., Elizabeth, New Jersey, shall be added to the paint before application in accordance with the manufacturer's directions. (0.5 ounce per gallon of paint).

3.4 Cleaning.- Upon completion of painting, the contractor shall clean up all litter caused by his work and shall remove his equipment from the premises.

4. SAMPLING, INSPECTION AND TESTING:

4.1 Sampling.- The inspector shall take two one-quart samples of each kind of paint furnished by the contractor for test purposes. At the option of the Government in lieu of taking paint samples, the contractor shall furnish a statement from the paint manufacturer that the paint conforms to the applicable Federal specification.

4.2 Inspection.- A Government representative will inspect all paint, both Government furnished and contractor furnished for color, weight and condition in the container when it is delivered to the job. Paint that does not meet the requirements shall be promptly removed from the job.

4.3 Testing.- Paint samples will be sent to the National Bureau of Standards for test. Paint failing to meet the requirements will be rejected and all painting done with rejected paint will be repainted with approved paint at the contractor's expense.

5. NOTES:

5.1 Rubber-Base floor paint should be specified in place of floor and deck enamel for concrete floors in contact with the ground and subject to dampness.

5.2 Where white paint is subject to discoloration by sulfide fumes, a lead-free paint conforming to Federal Specification TT-P-103 should be specified.

5.3 Aluminum paint is made by mixing two pounds of pigment (powder or paste) to one gallon of mixing varnish.

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DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

SPECIFICATION CAA-746b
September 1, 1950
(Supersedes Issue of
March 1, 1949)

SPECIFICATION FOR FENCES

I. **SCOPE:** This specification covers the requirements of the Civil Aeronautics Administration for fences to be constructed around air navigation facilities.

II. **TYPES AND CLASSES:** The types and classes of fences covered by this specification are as follows:

II-A. Types:

Type I - Steel Post Fence
Type II - Wood Post Fence
Type III - Wood Picket Fence
Type IV - Electric Fence
Type V - Board Fence

II-B. Classes:

Class C - Woven Wire Fencing Surmounted By Two Strands of Barbed Wire
Class D - Four Strands of Barbed Wire Fencing
Class E - Woven Wire Fencing Surmounted by Two Strands of Barbed Wire and an Extension with Three Strands of Barbed Wire
Class F - Chain Link Fence

III. **APPLICABLE SPECIFICATIONS AND DRAWINGS:** The following specifications and drawings of the issue in effect on date of invitation for bids shall form a part of this specification.

III-A. Federal Specifications:

TT-W-556	Wood Preservative, Coal-Tar-Creosote
TT-W-570	Wood Preservative, Pentachlorophenol
TT-P-25	Paint; Exterior-Primer, Ready-Mixed, White (Under Coat for Wood)
TT-P-40	Paint; Oil, Exterior, Ready-Mixed, Light-Tints and White
RR-F-183	Fence-Posts, Gates and Accessories
RR-F-221	Fencing; Wire (Barbed, Netting, and Woven) Black and Galvanized
RR-F-191	Fencing; Chain Link or Welded

III-B. American Wood Preservers Association Specification:

PI-48	Standard Specification for Creosote

III-C. Establishment Engineering Division Drawings:

Drawing No.	Title
566	Class "C" and "D" Fences
1048B	Class "E" Fences
1048C	Steel Posts, Braces, Extension Arms
D-2051	Details of Electric Fences
D-2109	Class "C" Fence with Steel Posts
D-2110	Class "D" Fence with Steel Posts
D-4215	Fence and Gates, Wood Picket
D-4745	Board Fence and Gate

IV. MATERIALS AND WORKMANSHIP:

A. Materials: The material used in the construction of the fence shall be new and as specified herein, or if not specified, of best commercial quality suitable for intended use.

B. Workmanship: The workmanship shall be first class, and the completed fence erected plumb and true to line as shown on the plot fencing plan.

V. WORK TO BE PERFORMED BY THE CONTRACTOR: Unless otherwise specified, the contractor shall furnish all labor and material, including excavation, backfill, grading, clearing, tools, and equipment, required to complete the work and deliver in place the fence complete as shown on the drawings and as specified. The fence lines will be staked by the government.

VI. GENERAL REQUIREMENTS: Fences shall be constructed where shown on the site fencing plans, and where ordered and staked by the government. The type and class of fence constructed shall be as specified in the invitation for bids.

/II. DETAIL REQUIREMENTS:

/II-A. Wire:

1. Woven Wire: The woven wire fencing shall be 7-bar, 26-inch field fence vith top and bottom wires No. 10 ASW gauge, and filler and stay wires, No. 12½ ASW jauge. Stay wires shall be spaced 12 inches apart (16 stays per rod). All wire hall be smooth galvanized steel wire spaced as shown on the drawing and conforming o Federal Specification RR-F-221, Type B, and the Department of Commerce Simplified ractice Recommendation R9-28.

2. Barbed Wire: Barbed wire shall be two strand twisted No. 12½ ASW gauge jalvanized steel wire with either two-point or four-point barbs of No. 14 ASW gauge jalvanized steel wire conforming to Federal Specification RR-F-221, Type A. Two-oint barbs shall be spaced 5 inches apart, and four-point barbs shall be spaced inches apart.

3. Chain Link Wire Chain link fence wire shall be No. 9 ASW gauge, with op and bottom selvages twisted and barbed, and shall be galvanized after weaving. hain link wire shall conform to Federal Specification RR-F-191.

4. Wire Gauge: For convenience of contractors, inspectors, or others, the following table shows the wire diameters for various ASW (American Steel Wire gauge. These gauge numbers shall not be confused with AWG (American Wire Gauge) formerly Brown and Sharpe gauge.

ASW Gauge Numbers	Wire Diameter (Inches)	ASW Gauge Numbers	Wire Diameter (Inches)
8	0.1620	11	0.1205
9	0.1483	12½	0.0985
9½	0.1416	14	0.0800
10	0.1350	14½	0.0760

VII-B. Wood Posts:

1. Species: All wood posts shall be one of the following species of wood unless written approval from the contracting officer is obtained in advance to use other species.

GROUP I

Cedar
Chestnut
Cypress, Southern
Locust, Black
Osage Orange
Redwood
Yew, Pacific
Honey, Locust
Oak, White
Mulberry
Live Oak

GROUP II

Douglas Fir
Gum, Red
Larch, Western
Pine, Southern Yellow
Pine, Lodgepole
Tamarac
Ash
Maple, Sugar
Oak, Red
Spruce

Posts of Group I may be used untreated provided at least 75 percent of the wood is heartwood. Posts of less than 75 percent heartwood of Group I and all posts of Group II shall be full length pressure treated.

2. Quality: Posts shall be peeled, sound, straight-grained, and free from decay, cracks, splits and shakes. Checks (lengthwise separations of the wood in a generally radial direction), are permitted provided they are not injurious.

3. Dimensions: Posts shall be the length shown on the drawings. Posts for Type III and Type V fences shall be of sawed lumber of the size shown on the drawing. Posts for Type II fences shall be:

a. 4-inch minimum top diameter for line posts and 8-inch minimum top diameter for corner, anchor and gate posts; or

b. 3-inch minimum top diameter line posts and 6-inch minimum top diameter corner, anchor, and gate posts at site where each side of the fenced area is less than 200 feet in length; or

c. 2½-inch minimum top diameter line posts and 5-inch minimum top diameter corner, anchor, and gate posts at any site, provided the posts are full length pressure treated as specified herein.

Line posts of similar size shall be selected so when placed in the fence line they will present a uniform appearance. Posts of Type IV fences shall be 4-inch minimum top diameter for line posts and 6-inch minimum top diameter for corner, anchor, and gate posts.

Sawed and split posts are acceptable in lieu of round posts provided their dimensions are such that round posts of required diameter could be turned therefrom. Limbs shall be trimmed flush with posts and outer bark completely removed. Posts to be treated shall have the inner bark removed except that inner bark may remain in depressions. The amount of wood shaved off in the removal of inner bark shall be held to a minimum.

5. Treatment: Posts shall be conditioned by air seasoning, by steaming, or by heating in oil in such a manner as will not cause injurious checking, splitting, or warping before treating. Corner, anchor, and gate posts shall have all required gains, roof and notches for braces cut before treating. The treatment shall be by an empty cell process with a final retention of six pounds preservative per cubic foot of wood in charge in accordance with the applicable A. W. P. A. Specifications T1-49 and T5-49. The preservative shall be coal-tar-creosote conforming to Federal Specification TT-W-556, which agrees with A. W. P. A. Specification No. P1-49; or a 5 percent minimum, by weight, pentachlorphenol petroleum solution; or a mixture of 50 percent coal-tar-creosote, and 50 percent of 5 percent minimum, by weight, pentachlorphenol petroleum solution. The pentachlorphenol solution shall be made by mixing a liquid concentrate of pentachlorphenol in fuel oil or kerosene, or by dissolving pentachlorphenol crystals of technical purity in suitable fuel oil solvents. Full length treated posts which are to be painted shall be pentachlorphenol treated.

VII-C. Steel Posts:

1. For Classes C, D and E Fences: All corner, brace, and gate posts shall be 7'-0"" long, of 2½" x 2½" x ¼" angles, and line posts 7'-0" long, of 1¼ x 1¼" x 1/8" angles. Other approved cross-sectional shape posts may be used provided they are equal or more in weight per linear foot than the angle shape specified. Posts shall be made of rail steel or hard grade billet steel conforming to A.S.T.M. Specification A-16 and A-15, respectively. All posts shall be hop dip galvanized after fabrication. Galvanizing shall be continuous and adherent, of two ounces minimum per square foot surface.

2. For Class "F" Fence: Line posts shall be galvanized steel "H" sections weighing 4.1 pounds per foot or more and as an alternate may be galvanized steel "U" sections weighing 4.2 pounds per foot or more. End, corner and walkway gate posts shall be 3" outside diameter galvanized steel tubing weighing 5.79 pounds per foot or more and as an alternate may be 2½" square galvanized steel tubing weighing 5.79 per foot or more. Gate posts for driveway gates shall be 4" outside diameter galvanized steel tubing weighing 9.1 pounds per foot or more and as an alternate may be 3" square galvanized steel tubing weighing 9.7 pounds per foot or more. For single driveway gates 13' to 18' wide, posts shall be 6-5/8" outside diameter galvanized steel pipe weighing 18.97 pounds per foot or more. All posts shall conform with Federal Specification RR-F-183.

VII-D. Rails, Braces, and Cleats:

1. Rails, braces, sills, and cleats for wood post fences shall be of the following species:

Species	Grade	Association Rules
Southern Yellow Pine	#1 Common	Southern Pine Association
Douglas Fir	#1 Common	West Coast Lumbermen's Association
Norway Pine	#2 Common	Northeastern Lumber Mfg. Association
Northern White Pine	#2 Common	Northeastern Lumber Mfg. Association

Cleats shall be full length preservative treated by the Pressure Process specified above for posts.

2. Rails, braces, and extension arms for steel post fences shall be of angle iron of the size shown on the drawing, and hot dip galvanized after fabrication. The material and galvanizing shall be as specified above for posts.

3. Rails and braces for chain link fence shall be 1-5/8" outside diameter galvanized steel tubing weighing 2.28 pounds per foot or more.

VII-E. Pickets and Boards: Pickets for Type III and boards for Type V fences shall be one of the following species:

Species	Grade	Association Rules
Norway Pine	#2 Common	Northeastern Lumber Mfg. Association
Ponderosa Pine	#2 Common	Western Pine Association
Tidewater Red Cypress	#2 Common	Southern Cypress Mfg. Association
Idaho White Pine	#2 Common	Western Pine Association
Sugar Pine	#2 Common	Western Pine Association
Redwood	#2 Common	California Redwood Association
Western Red Cedar	#1 Common	West Coast Lumbermen's Association

VII-F. Gate and Gate Hardware:

1. Metal Gates: Metal gates shall be constructed of galvanized steel tubing as shown on the drawing and shall be of the size as specified. The roadway gate shall have a diagonal brace running from the top corner of the hinge side to the lower corner of the latch side. Fabric shall be heavily galvanized and shall be of the size shown on the drawing. All wire shall be tied in firmly and securely to the gate frame. One center vertical brace is required for the driveway gate and none for the walkway.

2. Wood Gates: Wood gates for picket fences shall be constructed in accordance with the details of Drawing D-4215. Wood gates for board fences shall be in accordance with Drawing D-4745.

3. Gate Hardware:

a. For Type I Fences Except Chain Link: Hinges shall be similar or equal to Hinge Collar #K3934 manufactured by American Steel and Wire Company. A spring latch or a pig ear latch similar or equal to K3964A or K3954 manufactured by American Steel and Wire Company shall be installed on the gate.

b. For Chain Link Fences: Gates and gate hardware shall be heavily galvanized. They shall be equal to "Cyclone Safeguard" for fences without barbed wire top or "Cyclone Invincible" for fences with barbed wire top as manufactured by American Steel and Wire Co. As an alternate, the above gates and gate hardware may be equal to Type SD-1 for fences without barbed wire or Type SDA-1 for fences with barbed wire top as manufactured by Anchor Post Fence Co.

c. For Type II Fences: Heavily galvanized hinges and latches for wood posts shall be installed with each gate. Either a bolt or lag screw hinge may be used, and either a wing or butterfly latch may be furnished.

d. For Type III Fences: Heavily galvanized strap hinges for wood posts and galvanized hasp and staples shall be installed with each gate.

e. For Type V Fences: Heavily galvanized or bronze strap hinges and latches shall be provided for each gate as specified on drawings. Suitable bolts or lag screws shall be used for fastening hardware.

VII-G. Stays: Spiral or plain galvanized stays shall be furnished on all Type I and Type II fences. If plain stays are used, they shall be provided with suitable locks or fastenings at the intersection of the ongitudinal and stay wires, of such design as to prevent them from slipping either longitudinally or vertically. If the spiral type of stays is used, no additional locks are necessary.

VII-H. Electrical Equipment for Type IV Fence:

1. **Controller:** The controller shall be for either A.C. or D.C. power supply, as specified in the invitation for bids. The controller shall be of the mechanical interrupter type, which shall limit the current applied to the fence as well as prevent steady flow of current when the fence is short circuited. It shall be provided with a meter which shall indicate whether the fence is partially or completely short circuited. The D. C. controller shall operate on a six volt, direct current power supply, and shall be similar in design and equal in performance to Prime Manufacturing Company controller No. 670. The A. C. controller shall operate on a 120 volt power supply, and shall be similar in design and equal in performance to Prime Manufacturing Company controller No. 470. Each Controller shall be protected by a suitable lightning arrestor of a type recommended by the controller manufacturer, unless otherwise specified. The lightning arrestor shall be mounted on the outside of the shed wall and wired as shown on Drawing D-2051.

2. **Wiring:** Wiring to the fence shall be made with No. 14 Underwriters Laboratories Type GTO-5 ignition cable for 5,000 volt service.

3. **Insulators:** The contractor shall furnish the required number and type insulators to accomplish the wiring in the shed and on the fence. Insulators shall be as specified on Drawing D-2051.

4. **Underwriters' Laboratories Standards**: The bidder shall submit proof that the material or appliance he proposes to supply under this specification conforms to the standards of the Underwriters' Laboratories, Inc., as regards fire and casualty hazards. The label of the Underwriters' Laboratories will be accepted as conforming with this requirement. In lieu of the label, the bidder may submit independent proof to the satisfaction of the purchasing agency that his material or appliance conforms to the published standards, including methods of test, of the Underwriters' Laboratories. Compliance with the above preliminary requirements as regards fire and casualty hazards does not absolve the bidder from complete compliance with the other requirements of this specification in order to secure the acceptance of his material or appliance.

VIII. INSTALLATION DETAILS:

A. Clearing the Fence Line: The contractor shall clear and grade the fence lines sufficiently so that the fence will conform to the general contour of the ground. All rocks, weeds, brush, and trees in the fence line shall be removed, burned or otherwise disposed of to the satisfaction of the Government's representative. Stumps shall be cut off flush with the ground or removed if in the way of a post. The distance between line posts shall not be varied more than one foot along the line in order to miss a stump or rock, etc. When shown on drawings or specified elsewhere, existing fences coinciding with, or near the fence line, shall be removed by the contractor. The reclaimed posts shall be stacked and wire coiled or disposed of as directed by the Government's representative. Removing existing fence shall be included under "Clearing the Fence Line" unless covered by a separate item in the schedule.

VIII- B. Setting Posts:

1. Type I Fences: Steel line posts may be either driven, or set in dug holes, to the depth shown. All posts shall be plumb and in good alignment. Backfill shall be tamped and leveled. When posts are driven, care shall be exercised to prevent damage to posts as damaged posts shall be replaced at the contractor's expense. Corner, brace, anchor, and gate posts shall be set in a 1:3:5 mix concrete base as shown on the drawings. The top of the base shall be slightly above the ground surface, and sloped to drain. Steel posts shall not be cut off but shall be set full depth even if necessary to blast or drill rock. Anchor plate may be removed from posts set in rock.

2. Type II and Type IV Fences: Posts shall be set with the large ends down, plumb, and in good line on the side on which the wire is to be fastened. Heavier posts shall be used for end, corner, anchor, and gate posts. These posts shall also be anchored by gaining and spiking two cleats into opposite sides of the post as shown. Where rock is encountered, it shall be removed even if blasting is necessary to provide full depth holes. Line posts; where rock is encountered, may be cut off and set on creosoted 6"x6"x4'-0" long sills braced on both sides along the fence line with 2"x6"x3'-0" long braces, providing not more than two adjacent posts are set in this manner. Line posts shall be spaced as shown on the drawing, which spacing may be varied not more than one foot in order to avoid rocks, stumps, etc., in the fence line. Line posts adjacent to end, corner, and anchor posts shall be set and braced with braces and wire as shown on the drawing. The tops of posts shall be roofed with the high side next to the wire.

End, corner, anchor and gate posts shall be anchored by gaining and spiking cleats to the side of the post at right angles to the line of the fence, one at the bottom, the other just below the ground surface, as indicated on the applicable drawing. Line posts set in depressions of the ground shall be anchored by gaining and spiking two cleats into opposite sides of the post near the bottom.

Types III and V Fences: Posts shall be set plumb and in good line. All end, corner, and gate posts shall be set full depth and shall not be cut off to eliminate rock excavation. Where rock is encountered, it shall be removed even if blasting is necessary to provide full depth holes. Posts shall be spaced as shown on the drawing, although spacing may be varied not more than one foot in order to miss rocks, stumps, etc., in the fence line. End, corner, and gate posts shall be anchored by spiking cleats to the sides of the posts as indicated on the drawings.

VIII-C. Bracing Types I, II, and IV Fences: End, corner, anchor, and gate posts shall be braced as shown on the drawings. A cable made of a double strand galvanized soft iron wire looped around the end, corner, anchor, or gate post near the ground line and around the adjacent line post about 12 inches from the top shall be put on and twisted tight. Anchor posts shall be set at approximately 500-foot intervals and braced to the adjacent line posts as specified above. Posts shall be braced before the wire fencing is placed.

VIII-D. Installing Wire:

1. Types I and II Fences: Wires and extension arms shall be placed on the side of the posts away from the Government property. Longitudinal wires shall be stretched uniformly tight and parallel, with the vertical stay wires of the woven wire fencing straight and vertical. At end and gate posts, woven and barbed wire shall be wrapped once around the posts and stapled or clipped and the ends of the horizontal wires tied with a snug tight twist. Each Longitudinal wire shall be stapled to each post with a No. 9 galvanized steel wire staple, one inch long in hardwood and 1½ inches long in softwood posts or with a clip designed for use with steel posts. The top strand of barbed wire shall be stapled with two staples or clips in each post. All staples shall be set diagonally with the grain of the wood and driven home tight.

The bottom wire of the woven wire fencing shall clear the ground by not more than four inches or less than one inch at any point.

After wire has been placed, two fence stays shall be installed between line posts of class C and D fences, and one stay between line posts of the class E fence. No stays will be required between posts in braced panels. The stays shall extend from the top barbed wire strand to the ground, and shall be equally spaced between posts. If plain stays are used, they shall be properly locked or fastened to the longitudinal wires to prevent their slipping.

2. Type IV Fence: The wire shall be stretched uniformly tight and tied to a porcelain knob insulator at each line post with No. 12 galvanized soft iron wire. At corner, anchor, and gate posts, the wire shall terminate in a loop through a porcelain strain type insulator and be wrapped back around itself for at least six times. Each strain insulator shall be fastened to the post with two turns of No. 12 galvanized soft iron wire.

VIII-E. **Splicing Wire:** Wire splices in longitudinal wires will be permitted if made with an approved bolt clamp splice, or a wire splice made as follows: The end of the wires shall be carried three inches past splice tool and wrapped around the other wires away from the tool for a least six turns, and after the tool is removed, the space occupied by it shall be closed by pulling the ends together. Woven wire may be spliced only at posts.

VIII-F. **Installing Gate:** Gate shall be hung on two hinges attached in such a manner that the gate cannot be lifted off. Gate shall be installed to swing opposite to the slope of the extension arms, and if the driveway passes through the gate at an angle, it shall be hung on the side giving the greatest clear opening. To insure positive latching, the leg of the gatepost on which the latch is placed shall in all cases be installed at right angles to the line of the gate in its closed position. A stop shall be provided for holding the gate in an open position.

VIII-G. **Installing Controller and Wiring for Type IV Fence:** The D.C. Controller shall be mounted on the wall above the G-3 cabinet in the power shed, and connected through a five ampere fused DPST switch to a six-volt "Eveready Columbia Hot Shot" or equal dry cell battery placed on the floor under the cabinet. The switch shall be furnished and installed in the G-3 cabinet by the contractor. Wiring between the controller, G-3 cabinet and battery shall be 1/2-inch galvanized conduit. The leads from the switch shall be brought out the bottom of the G-3 cabinet and shall be run in conduit that terminates about 12 inches above the floor in a conduit bushing. The ground wire from the controller shall pass through the shed wall in a porcelain tube, loop around the lightning arrestor ground terminal, and then run down the outside of the shed wall and be clamped and soldered to a driven ground rod. The A. C. controller shall be mounted on the wall above the G-3 cabinet in the power shed, and connected through a five ampere fused DPST switch, furnished and installed by the contractor in the G-3 cabinet, to the 115-volt alternating current terminals of the G-3 cabinet emergency switch. Wiring between the controller and G-3 cabinet shall be ½" galvanized conduit. The ground wire shall be installed the same as described above for the Type D.C. controller. The cable shall be run from the controller through the shed wall in a porcelain tube, a drip loop formed then looped around the lightning arrestor line terminal and carried to high point of gable on porcelain knob insulators and tightly twisted around a No. 12 galvanized steel wire for overhead connection to fence. The overhead wire shall be fastened to porcelain knob insulator at top of gable and to insulator on high post in fence line, brought down this post on porcelain knob insulators spaced three feet apart on same side of the post as fence insulators and connected to the fence wire.

VIII-H. **Painting:** After erection, the entire Types III and V shall be painted, inclusive of the underside of rails and boards with a prime coat of white paint. The primer paint shall be in accordance with Federal Specification TT-P-25, and the finish paint in accordance with Federal Specification TT-P-40, Type I, Class A; other type fences will not be painted unless specified in the proposal.

VIII-I. Existing Fence Connections:

1. Types I, II, III and V Fences: Wherever the new fence joins an existing fence, either at a corner or the intersection of straight fence lines, a corner or anchor post shall be set at the junction and braced and anchored the same as herein described for corner posts and shown on the applicable drawing.

2. Type IV Fence: The electric fence shall not be connected in any way with existing fences on adjoining property. Wherever the electric fence joins an existing fence, either at a corner or the intersection of straight fence lines, separate posts shall be set and care shall be taken in erection to avoid installation that may later short circuit the electric fence through fences on adjoining property.

VIII-J. Cleaning Up: Upon completion of the fence, the contractor shall remove all tools, equipment and surplus material from the premises. Surplus dirt from post holes shall be scattered or removed. Rubbish that has been unearthed from post holes or by grading to smooth fence lines shall be burned or removed from the site. All work shall be left in a neat and orderly condition.

VIII-K. Payment: Unless otherwise specified in the proposal, the contract unit prices for various types of fence and for gates in place shall be full payment for all materials, clearing of fence lines, excavation and backfill, concrete, labor, water, tools, equipment, transportation, and other facilities necessary for the complete work. The length of fence for payment purposes shall be that obtained by a slope measurement of the fence as constructed, excluding gates. No extra allowances or time extensions will be made for the excavation of rock or wet or frozen material.

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
Office of Federal Airways
Washington

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SPECIFICATION FOR MATERIALS FOR AND FABRICATION OF STEEL STRUCTURES

Table of Contents

	Subject	Page		Subject	Page
I	Materials	2	IX	Detail Requirements	5
II	Handling of Material	2	X	Shop Assembly	8
III	Quality of Workmanship	2	XI	Inspection	8
IV	Welding	2	XII	Marking	8
V	Unit Stresses	3	XIII	Galvanizing	9
VI	Drawings	4	XIV	Painting	9
VII	Notice of Beginning of Work	5	XV	Miscellaneous	9
VIII	Mill Orders	5	XVI	Shipping	9

GENERAL:

This specification covers the requirements of the Civil Aeronautics Administration for materials for and fabrication of steel structures. All Specifications referred to herein shall be of the latest date.

22462

I. MATERIALS:

Materials shall conform to the following specifications except as modified herein.

A. Structural Steel

Federal Specification QQ-S-741 for structural steel (including welding) and rivets.

1. Grade A for towers over 350 feet high.
2. Grade B for other structures.

B. Bolts.

Federal Specification FF-B-571a for bolts, nuts, studs, and tap rivets - Class A.

C. Grating (Except Expanded Metal Grating).

Federal Specification RR-G-661.

D. Expanded Metal (Grating and Mesh).

Navy Department Specification 47 Mld.

E. Pipe

1. Structural purposes, Federal Specification WW-P-404 Type 1. Class A (Electric resistance welded or seamless).

   Type III

2. Ordinary purposes, Federal Specification WW-P-406.

II. HANDLING OF MATERIAL:

Material, plain or fabricated, shall be stored above ground and protected as far as practicable from corrosion. Material before being fabricated must be straight and if straightening is necessary, it shall be done without injuring the metal. Sharp kinks or bends shall be cause of rejection.

III. QUALITY OF WORKMANSHIP:

Workmanship shall be equal to the best general practice in modern steel fabricating shops. Portions of work exposed to view shall be finished neatly. Shearing, flame cutting and chipping when required shall be done carefully and accurately.

IV. WELDING:

Welding, if called for on applicable drawings, shall be done in accordance with the requirements of the American Welding Society's specifications.

V. UNIT STRESSES - POUNDS PER SQUARE INCH:

A. Direct Stress.

1. Axial tension on net section ---------------- 20,000
2. Tension in butt welds - section through throat ------------------------------------ 20,000
3. Tension on threaded part at root of thread ------------------------------------ 16,000
4. Compression on gross section for $\frac{l}{r}$ up to 150 ------------------------------- $20{,}000 - 85\frac{l}{r}$
5. Compression on gross section for $\frac{l}{r}$ 150 to 200 ------------------------------- $15{,}500 - 55\frac{l}{r}$
6. Maximum compression on gross section for any $\frac{l}{r}$ --------------------------------- 15,000
7. Compression on butt welds - section through throat ------------------------------------ 20,000

B. Bending Stress.

1. Tension on extreme fibers ------------------- 20,000
2. Compression on extreme fibers for $\frac{l}{b}$ up to 40 --------------------------- $\dfrac{22{,}500}{1 + \frac{1}{1800}\left(\frac{l}{b}\right)^2}$
3. Maximum compression for any $\frac{l}{b}$ --------------- 20,000

   l laterally unsupported length of member

   b width of flange
4. Extreme fibers of pins ---------------------- 30,000

C. Combined Bending and Axial Stress.

$\frac{f_a}{F_a} + \frac{f_b}{F_b}$ equal or less than unity

f_a = axial stress

F_a - allowable axial stress

f_b - bending stress

F_b - allowable bending stress

D. **Shearing Stress.**

1.	Rivets, finished bolts and pins	15,000
2.	Unfinished bolts	12,000
3.	Webs of beams, gross section	13,000
4.	Welds, fillet, plug or slot	13,600
5.	Welds, section through throat	13,000

E. **Bearing Stress.**

		Double	Single
1.	Rivets, finished bolts and pins	40,000	32,000
2.	Unfinished bolts	27,000	24,000
3.	Contact area	30,000	

F. **Slenderness Ratio.**

1. The ratio of unbraced length to the least radius of gyration $\frac{(l)}{(r)}$ for compression members shall not exceed:
   - a. For main compression members ------------------ 140
   - b. For bracing with calculated compression stress ------------------ 200
   - c. For nominal compression members with no calculated stress ------------------ 240
2. The ratio of laterally unsupported length and width of compression flange for members subjected to bending shall not exceed ------------------ 40

I. **DRAWINGS:**

Unless otherwise specified in the proposal, the contractor shall prepare acceptable shop detail and erection drawings. The detail drawings shall show all necessary dimensions for fabricating the parts and the erection drawings shall show all part marks and size and length of bolts. He shall furnish to the contracting officer three (3) prints of each drawing for the purpose of approval and shall not begin fabrication of any part until the pertinent drawing has been approved. The approval of detail drawings relates to the strength and detail and does not relieve the contractor from responsibility for errors in dimensions and fitting of parts. After all drawings have been approved he shall furnish to the contracting officer one cloth transparent copy of each drawing suitable for making clearly legible prints by the blueprint or ozalid process. These drawings will be the property of the government and may be used as contract drawings for future purchases or in any other way that the contracting officer deems will be in the best interest of the government.

VII. NOTICE OF BEGINNING OF WORK:

The contractor shall give the contracting officer ample notice of the beginning of work at the mill or in the shop, so that inspection may be provided. The term "mill" means any rolling mill or foundry where material for the work is to be manufactured. No material shall be manufactured or work done before the contracting officer has been so notified.

VIII. MILL ORDERS:

The contractor shall furnish the contracting officer with copies of mill orders.

IX. DETAIL REQUIREMENTS:

A. Holes.

1. All holes shall be either punched or drilled of sizes shown on applicable drawings.

2. Holes in a contiguous group in the same plane shall not show an offset between adjacent thicknesses of metal greater than the difference between the diameters of the holes and bolt for bolted connection nor greater than 1/16 inch for riveted connection.

3. Holes must be clean-cut without torn or ragged edges. Poor matching of holes may be cause for rejection.

4. Holes for connection of tension members shall, if practicable, be spaced to allow for draw.

B. Rivets.

1. The size of rivets called for on applicable drawings shall be the size before heating.

2. Rivet heads shall be of standard shape, unless otherwise specified and of uniform size for the same diameter of rivet. They shall be neatly made, concentric with the rivet holes and in full contact with the surface of the member. Rivets shall be heated uniformly and driven while hot except as states hereinafter for small rivets. When a rivet is ready for driving it shall be free from slag, scale or any adhering matters. Rivets that are loose, burned or badly formed, or otherwise defective shall be removed and replaced with satisfactory rivets. Rivets 3/8 inch or less in diameter may be driven cold.

C. Bolts.

1. Unfinished Bolts (Ordinary Rough or Machine Bolts): Unfinished bolts shall be used unless otherwise specified or applicable drawings or in the proposal. They shall be type A-1 - threaded class 1. loose fit. Galvanized nuts may be threaded over size not to exceed 0.015 inch and 1/32 inch on pitch diameter if tapped after or before galvanizing respectively. No thread shall be within the grip of the metal but shall extend a minimum of three (3) threads beyond the outside nut. A washer shall be used under each nut when specified.

2. Turned Bolts: Turned bolts, if specified on the applicable drawings or in the proposal shall be type A-2 threaded class 2. free fit. Galvanized nuts may be threaded over size not to exceed 0.015 inch and 1/32 inch on pitch diameter if tapped after or before galvanizing respectively. Lengths of shank and thread shall be as specified for unfinished bolts, and a washer shall be used.

3. Special Ribbed Bolts: Ribbed bolts, with drive fit, shall be furnished when specified on applicable drawings or in the proposal. Oversize bolts for replacement due to improper fit in an amount not less than 10% of the number of ribbed bolts specified shall be furnished.

4. Locknuts : Towers shall be provided with one locknut for each bolt except that each anchor bolt shall be provided with one extra regular nut in lieu of locknut. Other structures shall be provided with locknuts if specified in the proposal or on the applicable drawings. Locknuts shall be similar in action to "Palnuts" as manufactured by the Palnut Company of Irvington, New Jersey.

D. **Cutting.**

Re-entrant cuts shall be filleted a minimum of one-half (1/2) inch before cutting. Steel may be flame-cut provided a smooth surface is secured by use of a mechanical guide or if cut by hand, the surface shall be made smooth by planing, chipping or grinding.

E. **Eccentric Connections.**

The details shall be made so that eccentricities in connections are reduced to a minimum.

F. **Minimum Edge Distance.**

The minimum edge distance, except for flanges of beams and channels shall be as follows:

Bolt or Rivet	For Rolled Edge	For Sheared Edge
3/4 inch diameter	1-1/8 inch	1-1/4 inch
5/8 " "	1 "	1-1/8 "
1/2 " "	7/8 "	1 "
3/8 " "	3/4 "	7/8 "

G. **Minimum Spacing.**

The minimum spacing of holes shall be three (3) times the diameter of bolt or rivet but preferably not less than

2-1/2 inch for 3/4 inch diameter bolts or rivets
2 " " 5/8 " " " " "
1-3/4 " " 1/2 " " " " "
1-1/2 " " 3/8 " " " " "

H. **Maximum Edge Distance.**

The maximum distance from any edge shall be eight (8) times the thickness of the plate.

I. **Abutting Joints.**

Abutting ends of compression members shall be faced if so specified on applicable drawings. When ends are not faced the opening between them shall not exceed one-eigth (1/8) inch.

J. **Latticing.**

End tie plates shall have a length not less than the distance between lines of rivets or bolts connecting them to the flanges, and intermediate tie plates a length not less than one-half (1/2) this distance. Their thickness shall not be less than one-fiftieth (1/50) of the same distance. The minimum thickness of lattice bars shall be one-fortieth (1/40), and one-sixtieth (1/60) of the distance between centers of rivets or bolts connecting them to the flanges for single and double lattice respectively. The inclination of lattice bars with the axis of the member shall preferably not be less than 45 degrees. When the distance between rivet or bolt lines in the flanges is more than fifteen (15) inches, the lattice shall be double if a one-bolt or one-rivet connection is used.

X. SHOP ASSEMBLY:

In order to inspect the workmanship and detect possible errors the following shop assembling shall be done in the presence of an authorized government representative unless otherwise specified.

A. All Towers.

One complete face of each different tower.

B. Towers with Insulators.

In addition to one complete face as specified in "A" above, one complete tower up to one panel above the insulators.

C. Towers in Quantity Production.

Small towers in quantity production when specified in the proposal or on applicable drawings shall have one complete sample tower erected in advance of quantity production. Any error discovered during the erection of the sample tower, shall be corrected before the towers will be accepted.

XI. INSPECTION:

The contractor shall furnish facilities for the inspection of material and workmanship in the mill and shop and an authorized government representative shall be allowed free access to the necessary parts of the work. The contracting officer shall be notified in time so he may arrange for inspection of shop assemblies when such assemblies are part of the requirements. The contractor shall be responsible for correctly fabricating all members and parts whether or not such inspection has been made or whether or not errors are discovered before or during field erection.

XII. MARKING:

Each separate member, except bolts, nuts and washers, shall be plainly marked with a steel stencil. All like parts shall have the same marks placed in the same relative position on each part. All marks shall be stamped into the steel before galvanizing or painting in such manner as to make the marks plainly visible after galvanizing or painting. All marks shall be placed in a position to be most visible in the erected structure.

XIII. GALVANIZING:

Galvanizing, if specified on the applicable drawings or in the proposal, shall be done after fabrication by the "hot-dip" process in accordance with Specification A-123 and be able to withstand four (4) Preece test dips except for materials less than 1/8 inch thickness which shall withstand at least two 1-minute dips followed by one 1/2-minute dip according to Specification A-239 both of the A.S.T.M. Bolts and nuts shall be galvanized by the same method but threads of the nuts may be uncoated.

XIV. PAINTING:

Shop painting, if specified on the applicable drawings or in the proposal shall be one coat of red lead and linseed oil. The steel shall be cleaned free of all loose mill scale, rust, slag, oil, dirt or any other foreign matter before being painted.

XV. MISCELLANEOUS:

Bolts, nuts, locknuts and washers shall be furnished in the amount of 10% above the amount called for on the applicable drawings.

XVI. SHIPPING:

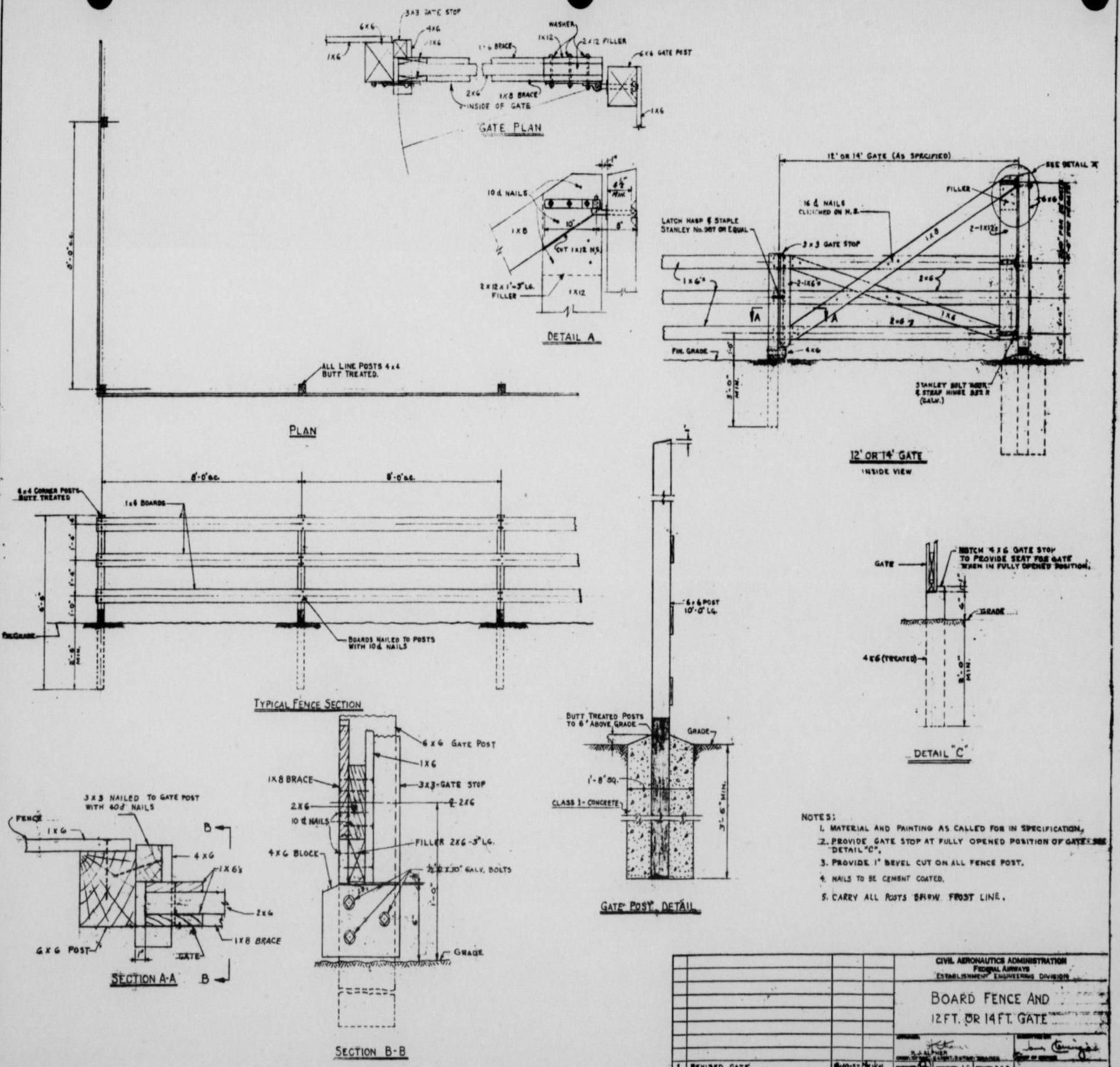
Structures shall, unless otherwise noted, be shipped knocked down. Ladders shall be assembled and shipped in lengths convenient for handling. Light members, including ladders, shall be nested two or more sections in order to minimize danger of injury in shipping. Small parts shall be shipped in bundles or boxes of size and weight convenient for handling without use of lifting equipment. No bundles nor boxes shall contain parts for more than one tower. When more than one tower is to be shipped to the same destination, all bundles and boxes shall have painted in a conspicuous place a color band of different color for each tower even though some towers may otherwise be identical. Care must be taken that each tower is complete and the shipment prepared with all parts in good order and condition.

The bill of lading shall have securely attached to it a packing list giving complete statement of material shipped, including shipping mark for each bundle, box, etc., and a list of members and size of all bolts, nuts, etc., all set up in such a manner that the consignee may readily identify and check each shipment for loss or damage upon its arrival at destination.

There shall be included with each tower special wrenches for locknuts, two (2) for each size, and one complete set of erection drawings and one complete packing list packed in a water-proof container placed in a box clearly marked that it contains these items.

Bolts, nuts, locknuts, and washers shall be packed unassembled, each size in individual bags of extra heavy burlap and all bags for each tower shall be packed in one or more boxes or kegs. Each bag shall be tagged to show number and size of items contained therein.

ooooooooooOOOoooooooooo



NOTES:

1. MATERIAL AND PAINTING AS CALLED FOR IN SPECIFICATION.
2. PROVIDE GATE STOP AT FULLY OPENED POSITION OF GATE - SEE DETAIL "C".
3. PROVIDE 1" BEVEL CUT ON ALL FENCE POST.
4. NAILS TO BE CEMENT COATED.
5. CARRY ALL POSTS BELOW FROST LINE.

1	REVISED GATE	8-10-52	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

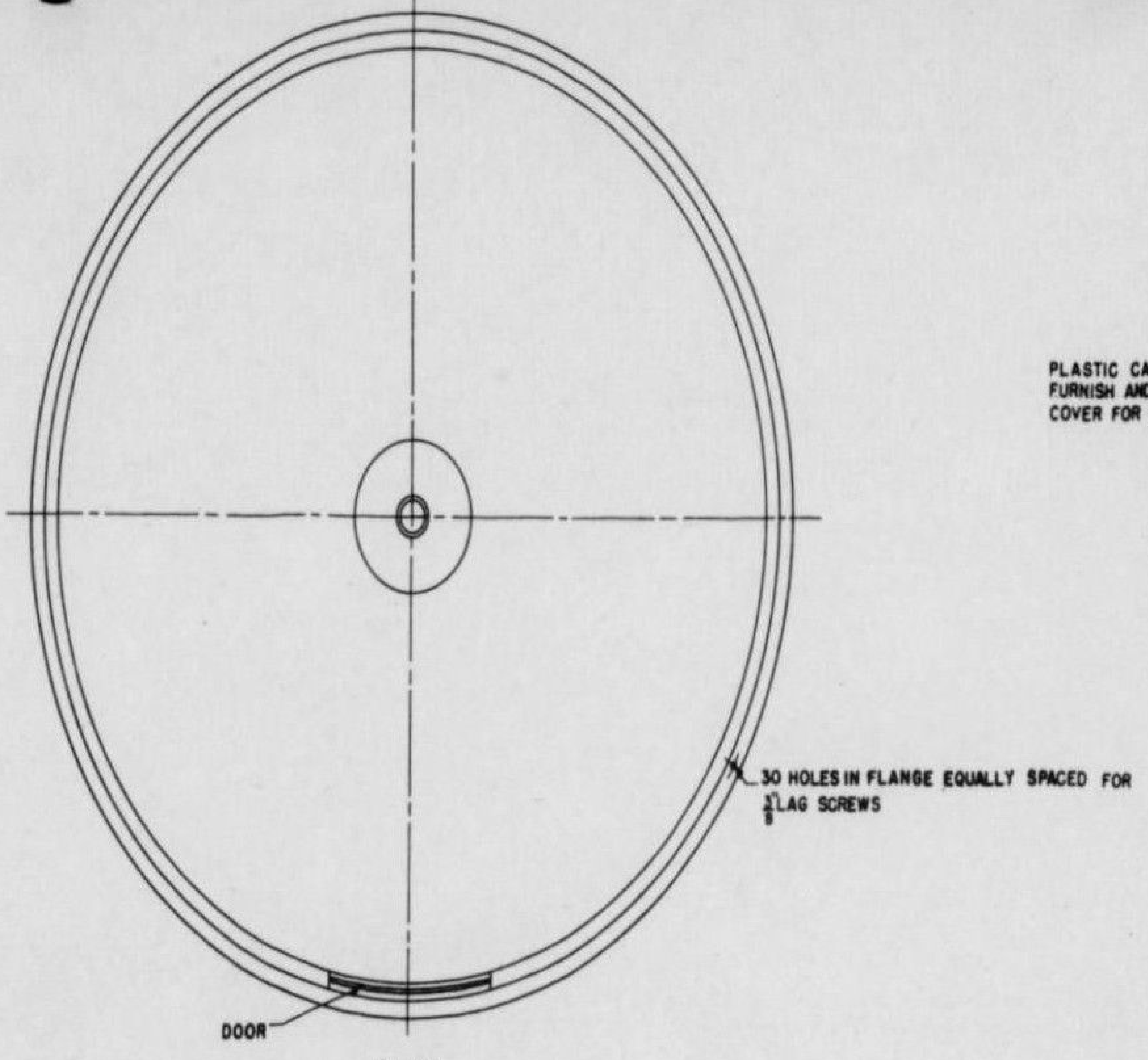
BOARD FENCE AND
12 FT. OR 14 FT. GATE

R. J. ALPHER

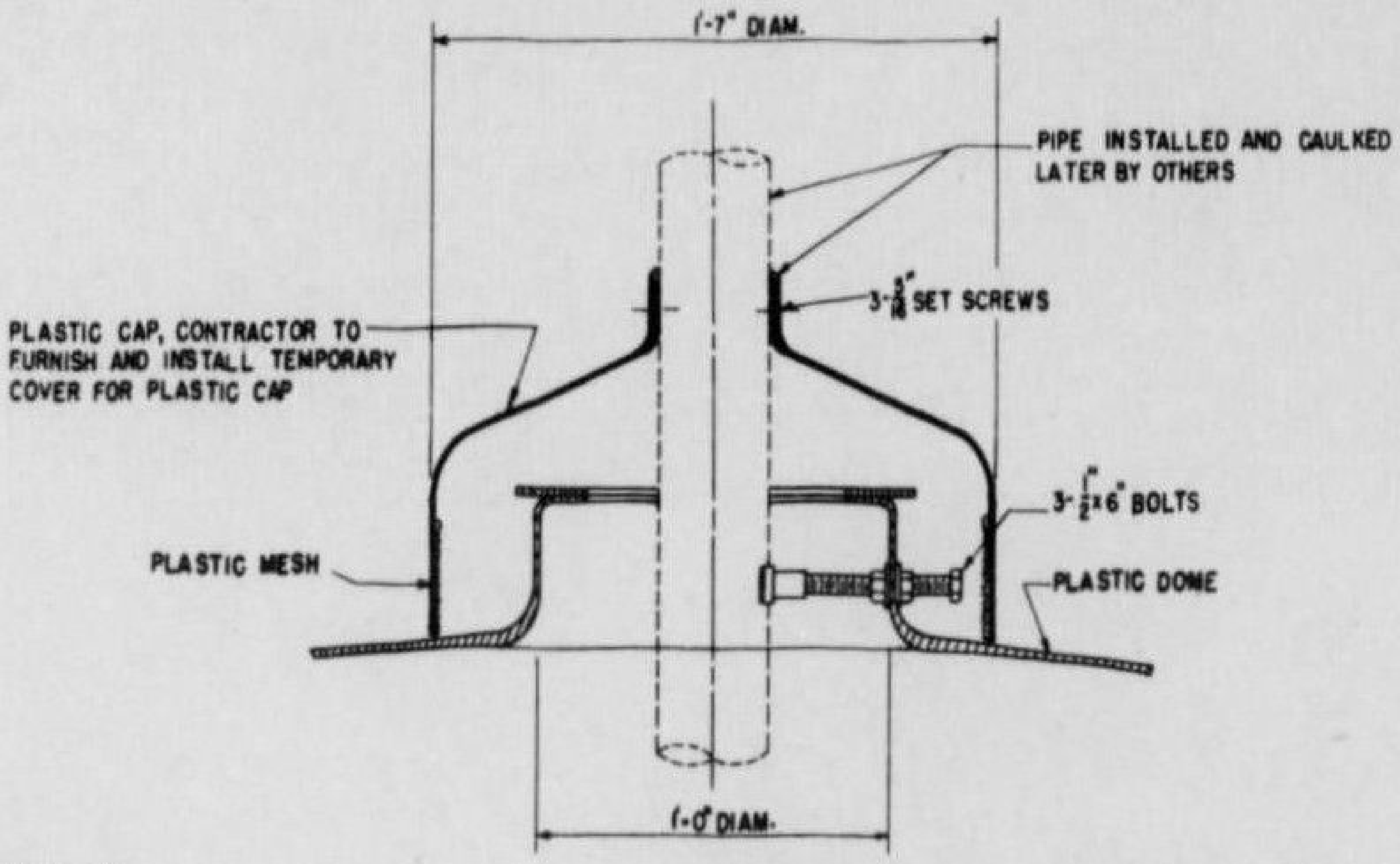
DR. D-4745

22731

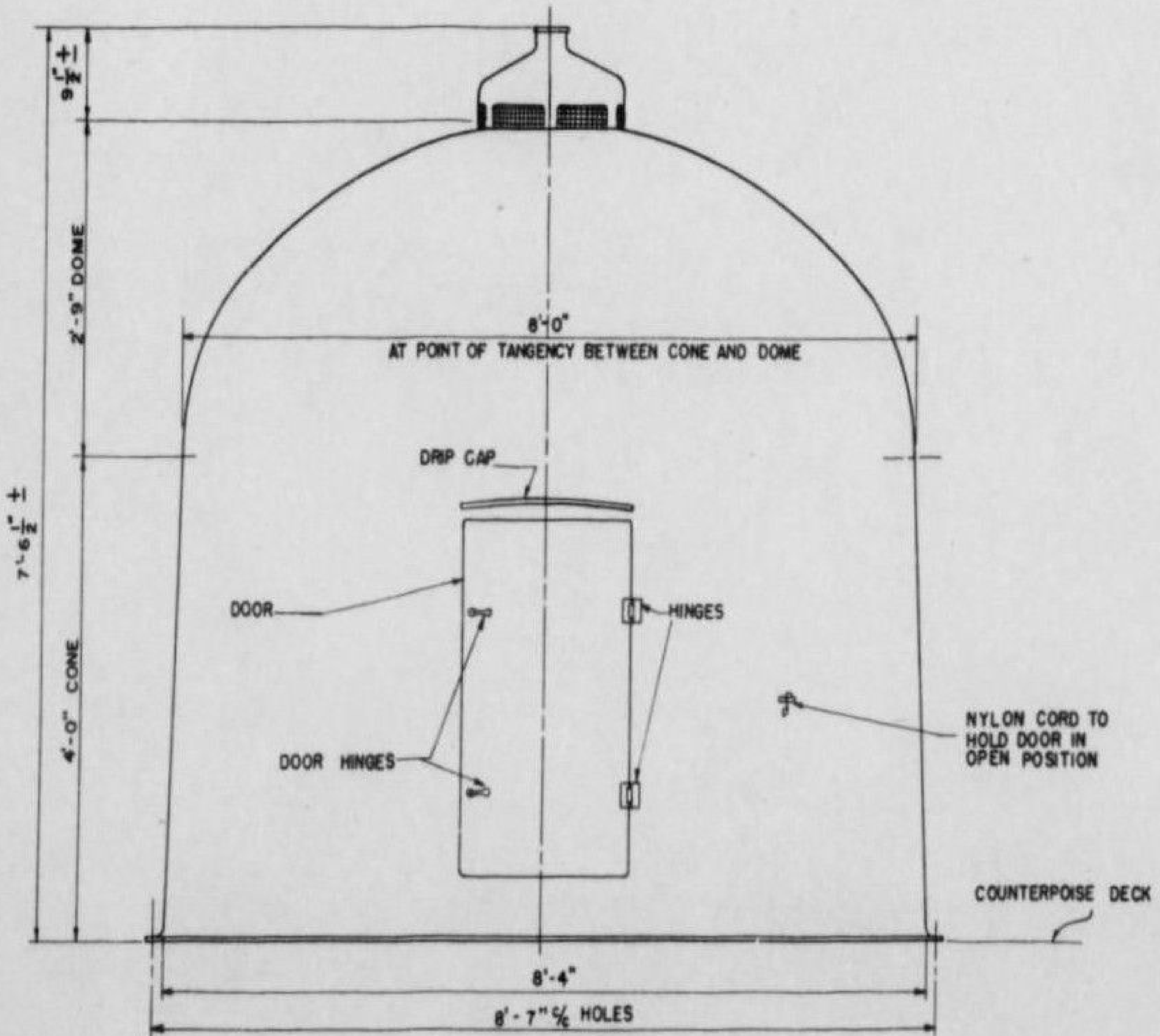
7/24/53 Received - ordered



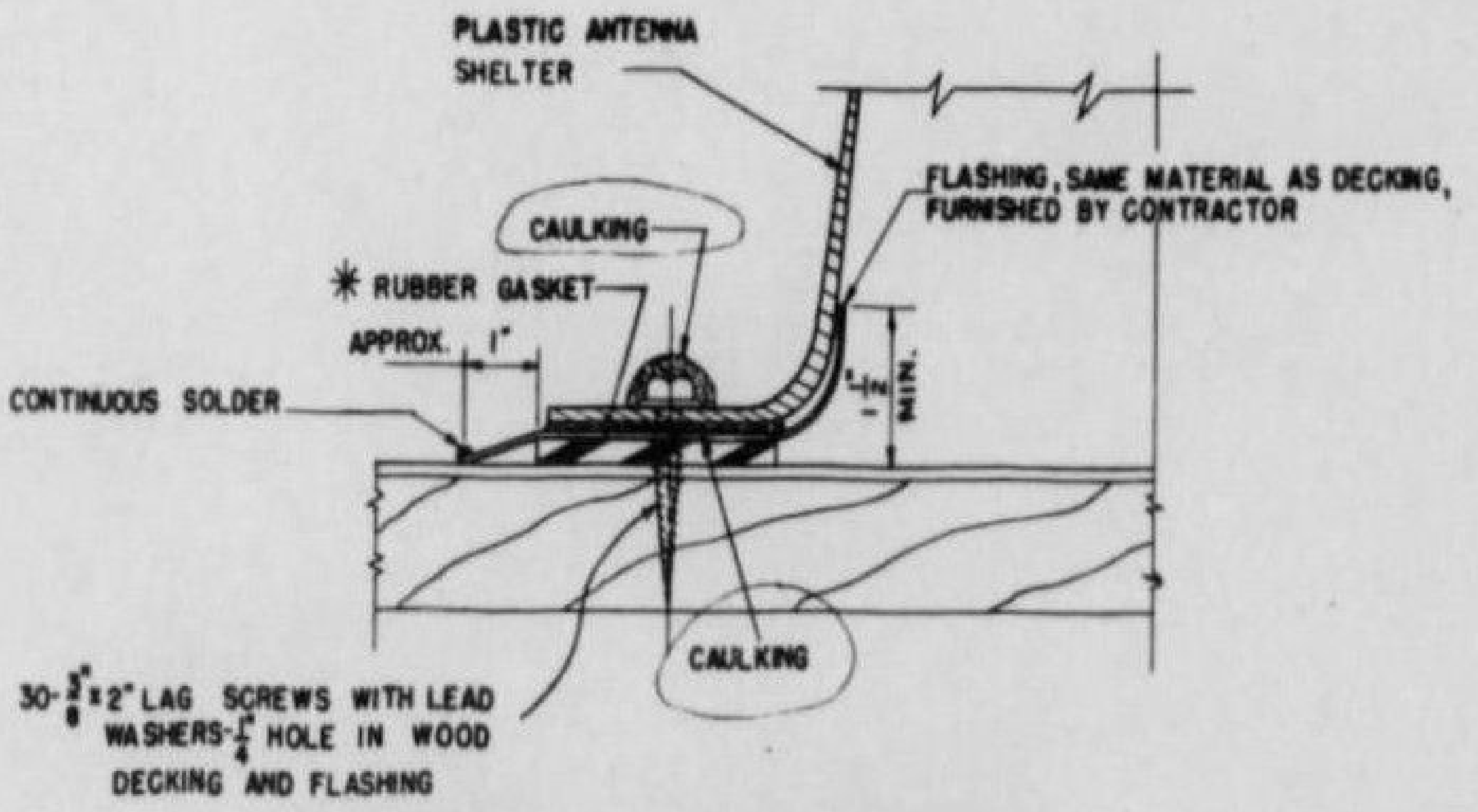
PLAN



DETAIL - PLASTIC CAP



ELEVATION



ANTENNA SHELTER ANCHORAGE

*(GASKET FURNISHED LOOSE WITH ANTENNA SHELTER
SET IN BED OF CAULKING IF NO GASKET IS FURNISHED)

NO.	REVISION	DATE	CHECKED
3	CAULKING ADDED AT BASE	1-17-51	
2	ANCHORAGE DETAIL REDRAWN	9-28-50	
1	RUBBER GASKET & MINOR REVISIONS	9-7-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
PLASTIC ANTENNA SHELTER
ERECTION

APPROVED: for R. J. ALPHER
CHIEF, STRUC. & LIGHT. ESTAB. BRANCH

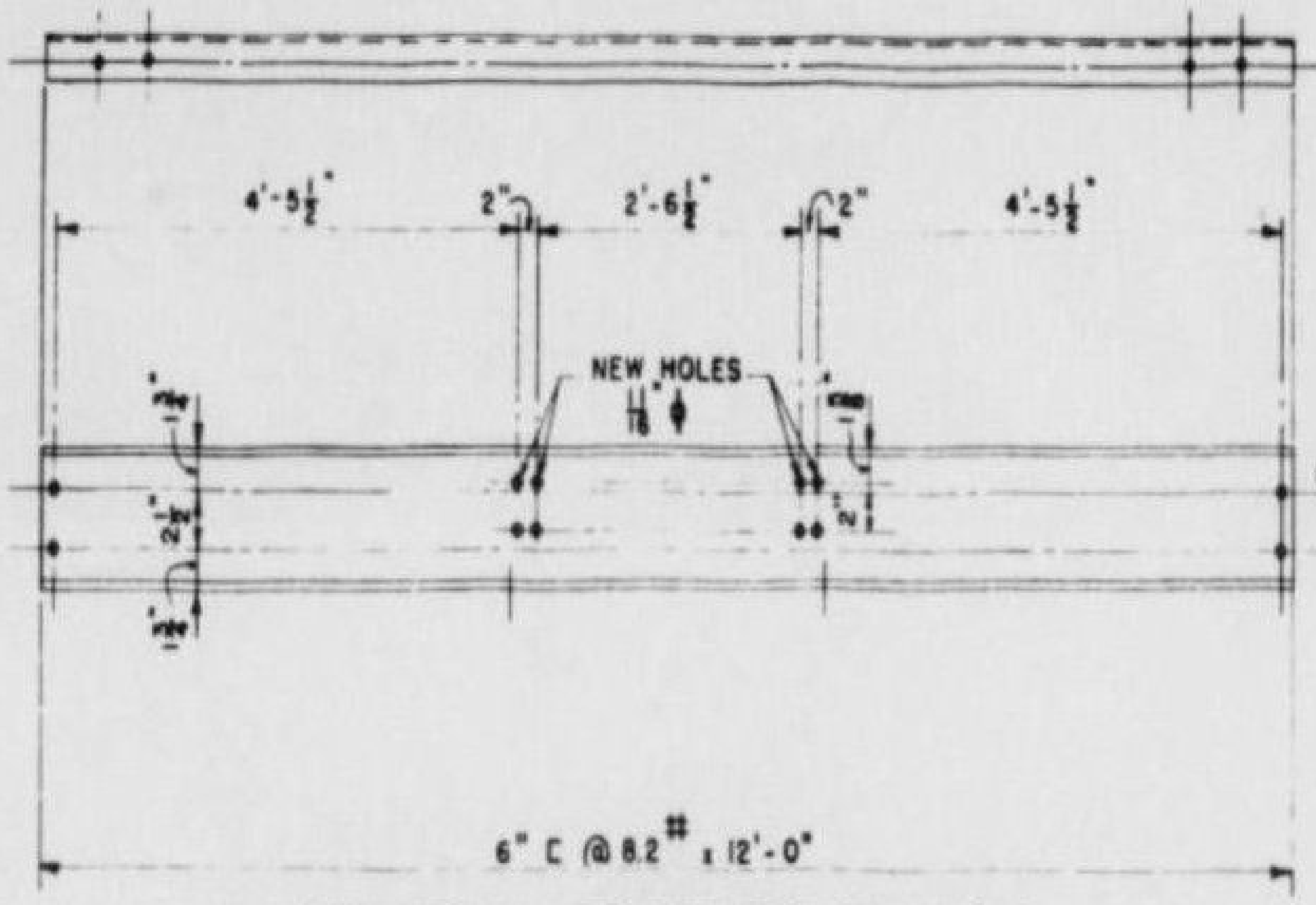
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION

CHECKED:
DESIGNED:
DRAWN: D.S.C.
TRACED:
DATE: 8-9-50

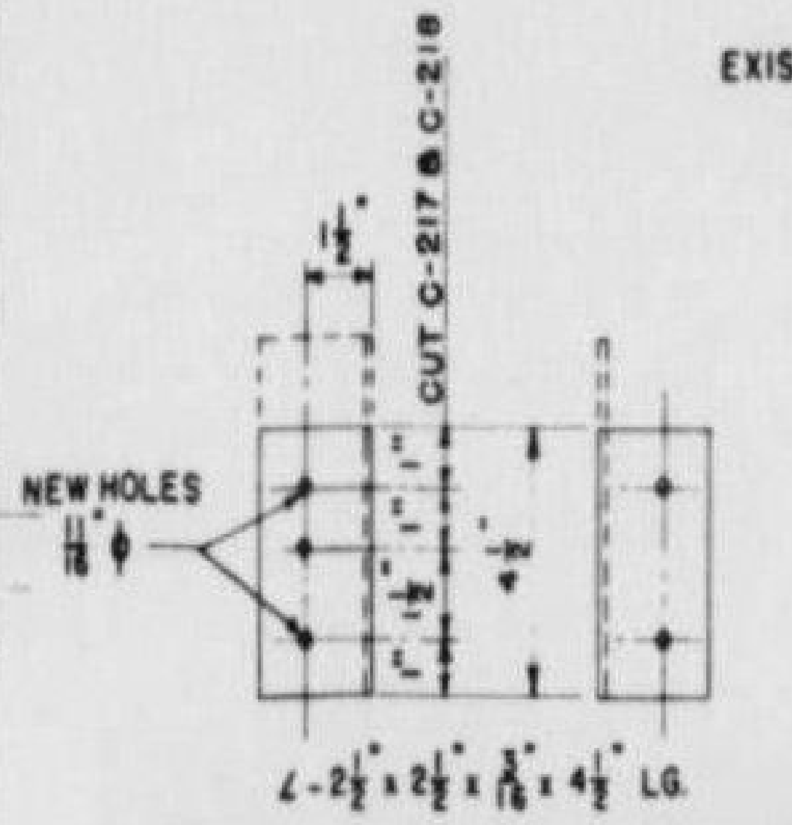
DR. D-4740

23233

8/7/53 Reviewed - Retired

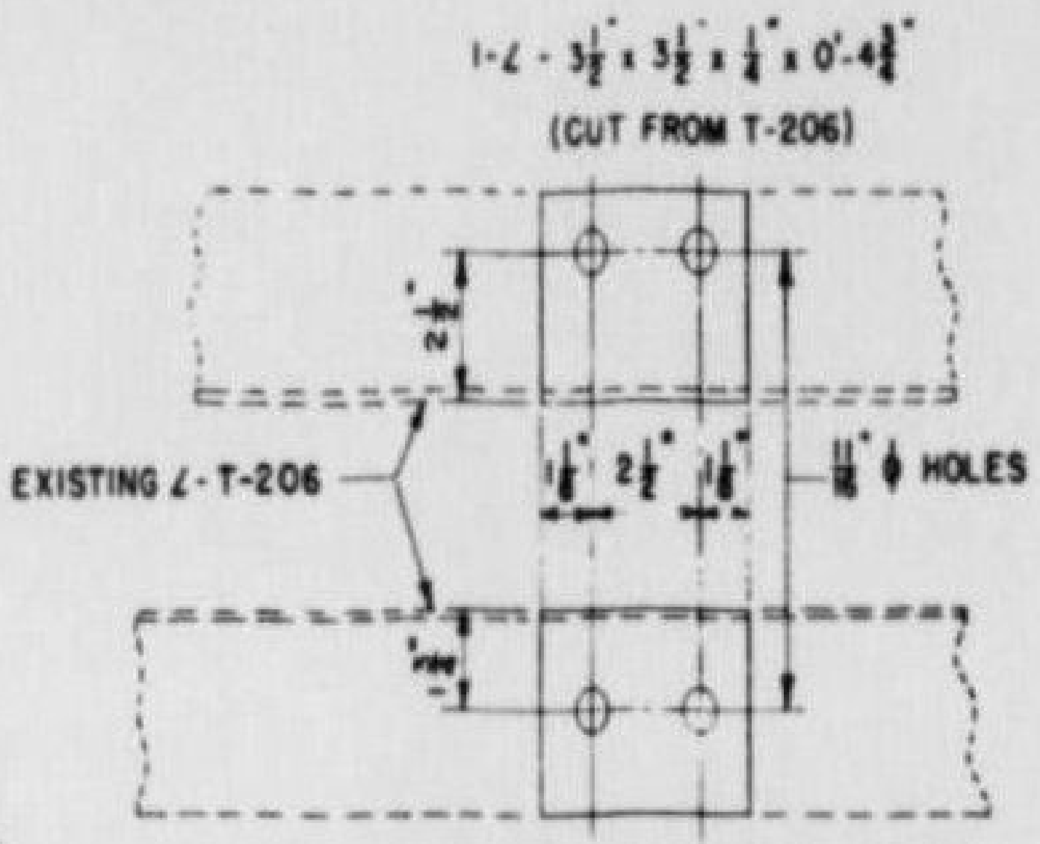


2-CHANNELS MK. C-219- MODIFIED MK. C-219-A

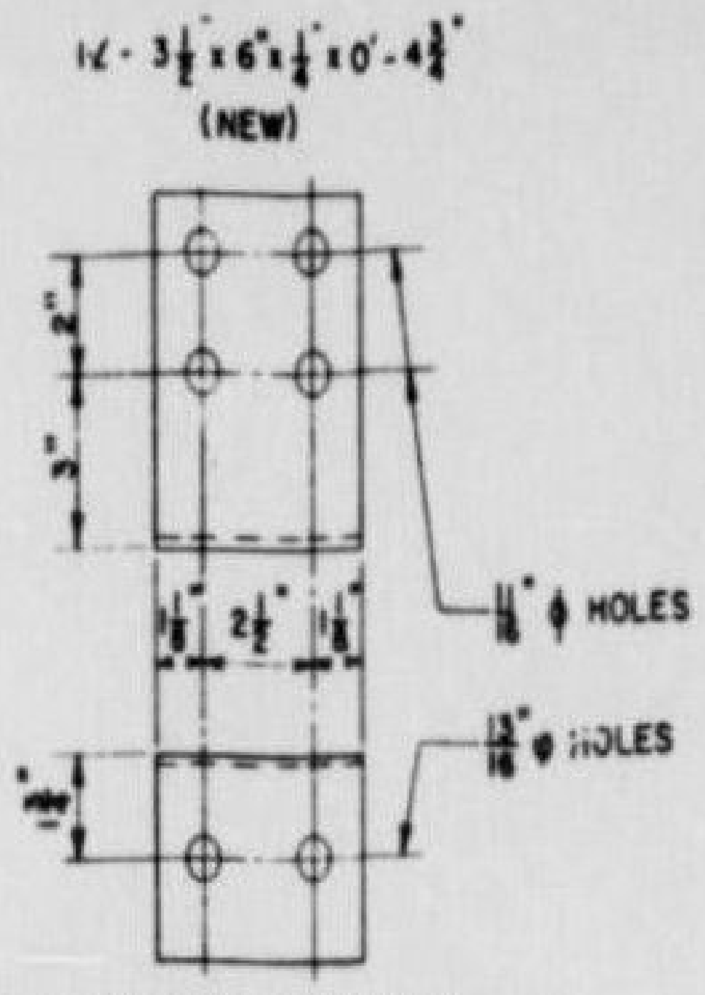


2-ANGLES MK. C-217-AS SHOWN-MOD. MK. C-217-A

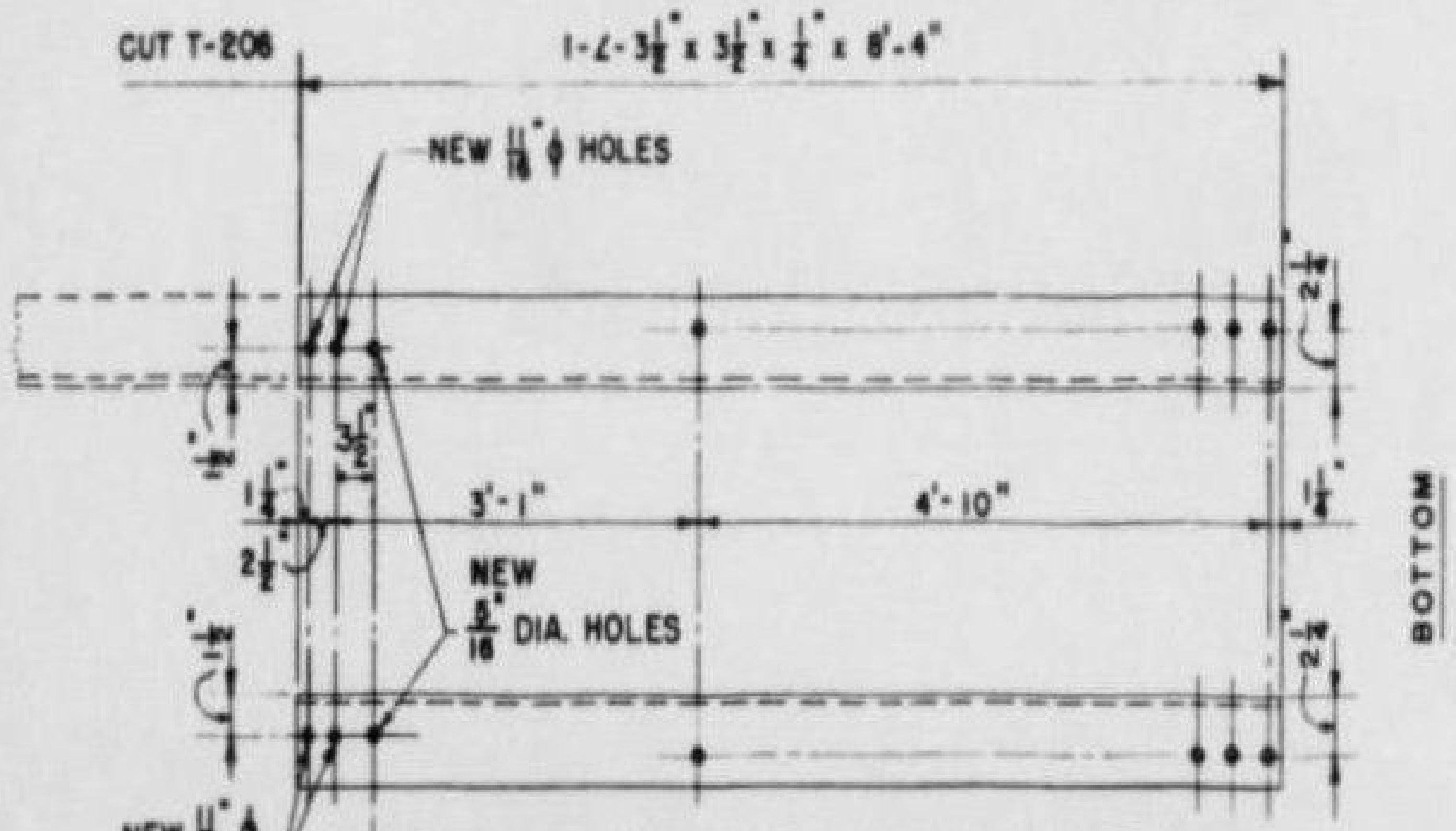
2-ANGLES MK. C-218-OPP. HAND-MOD. MK. C-218-A



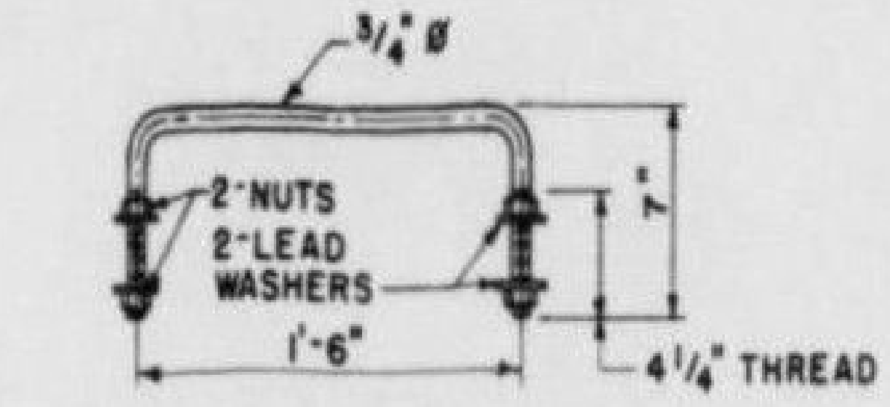
4-ANGLES MK.T-206 MOD. MK.T-206-B



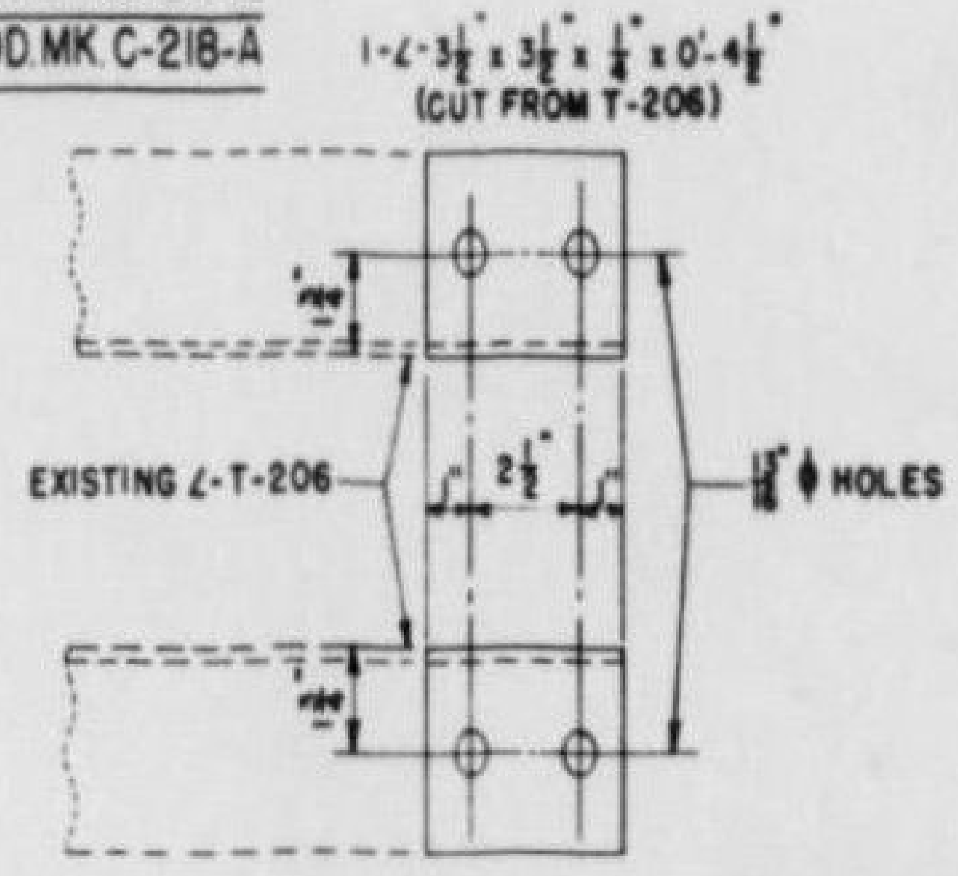
4-NEW ANGLES MK. N-1



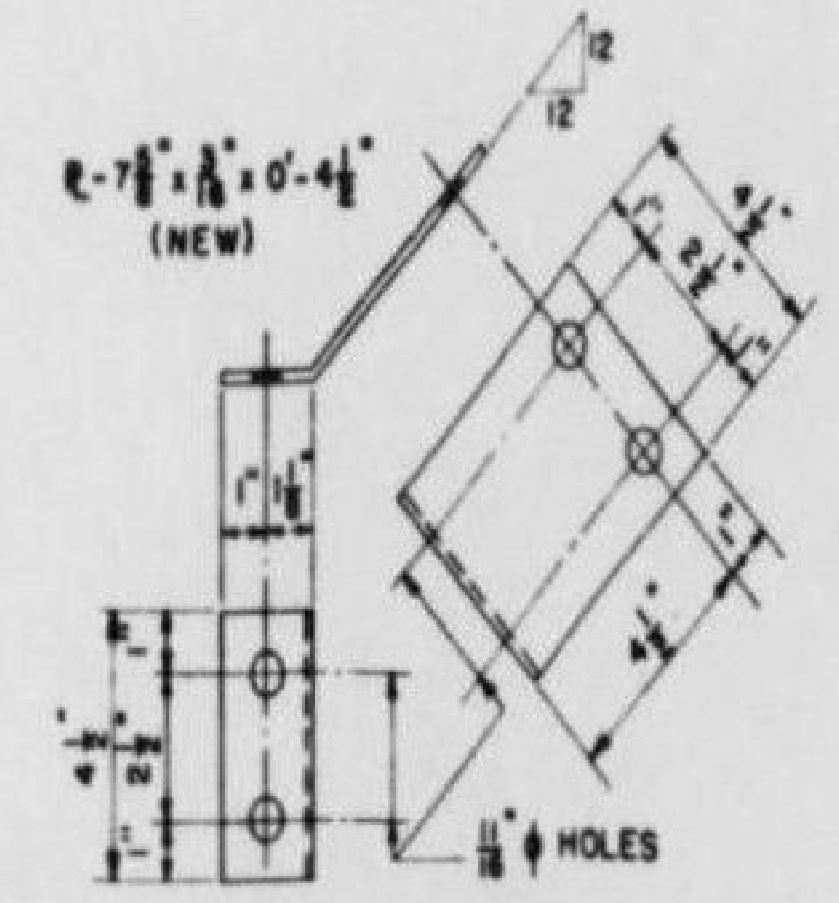
4-POST ANGLES MK. T-206-MODIFIED MK. T-206-A



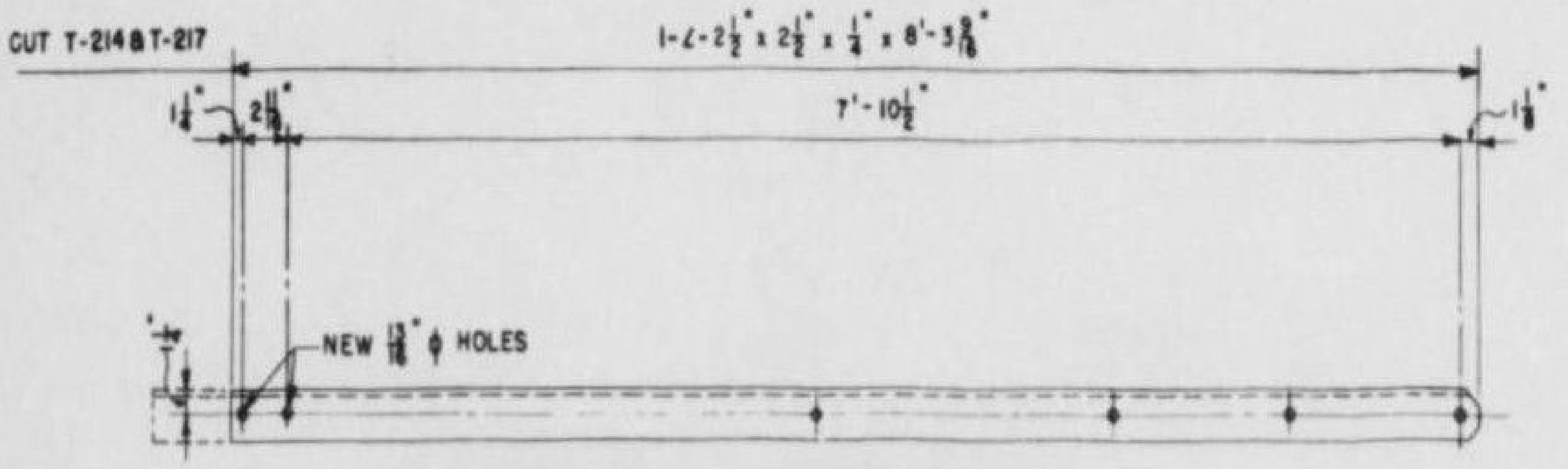
2-NEW HAND GRIPS MK. N-5



4-ANGLES MK. T-206 MOD. MK. T-206-C

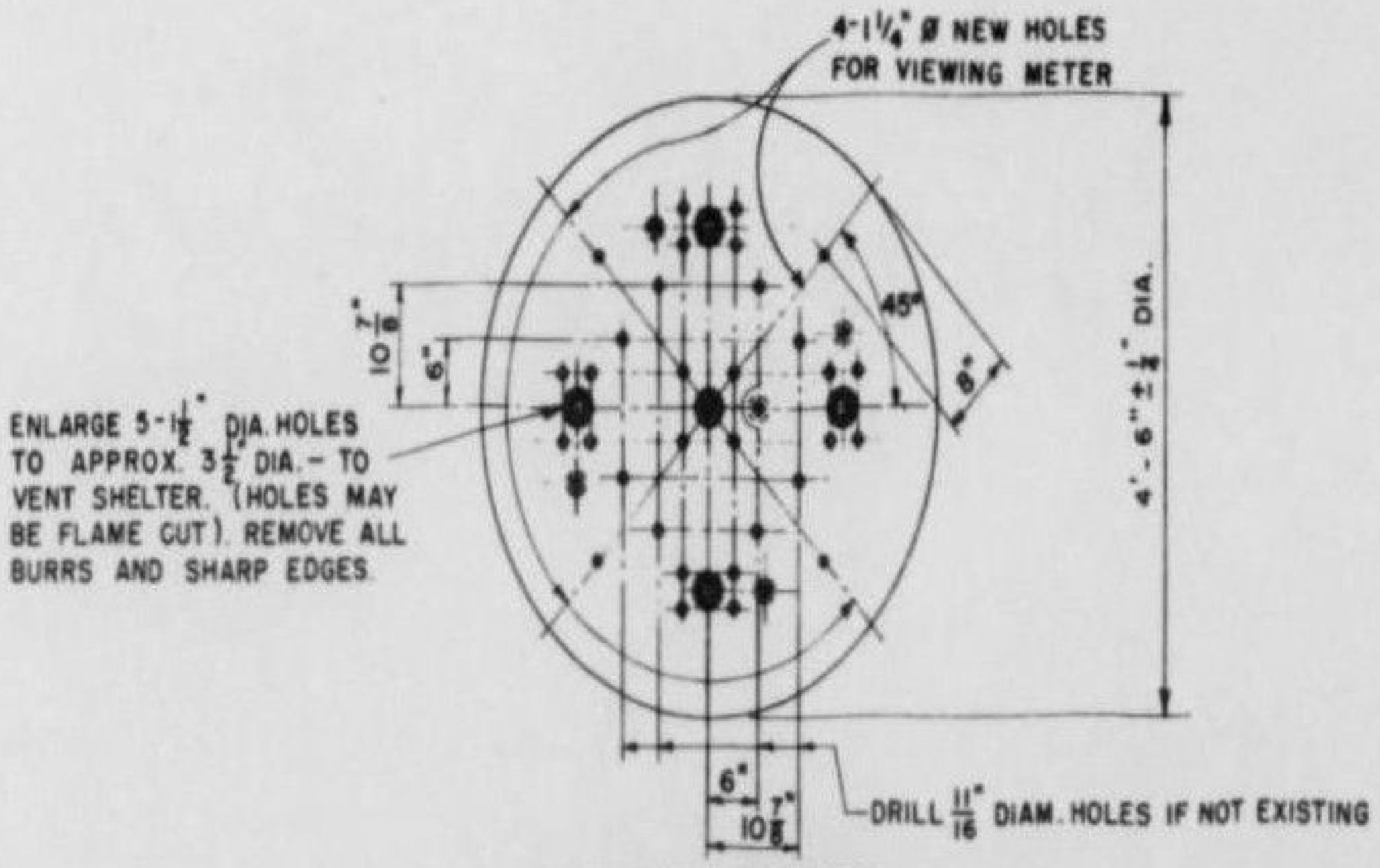


4-NEW BENT PLATES MK. N-2

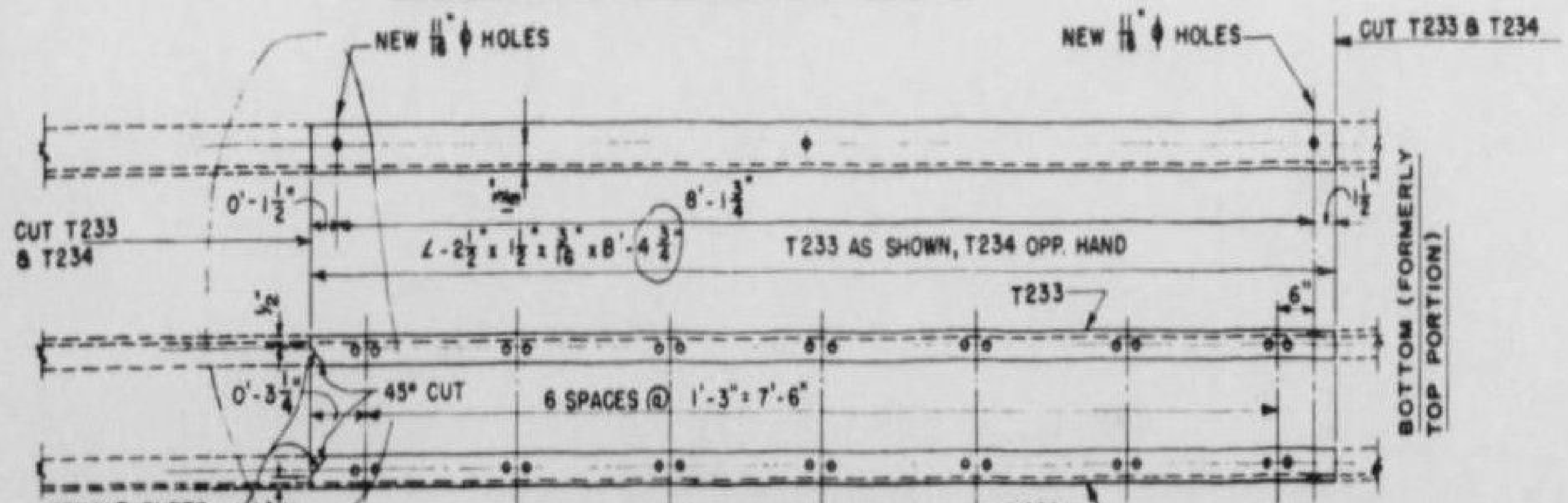


2-ANGLES MK. T-214-MODIFIED MK. T-214-A

2-ANGLES MK. T-217-MODIFIED MK. T-217-A


4-1 1/4" ø NEW HOLES FOR VIEWING METER
45°
8"
10 7/8"
6"
4'-6" ± 1/2" DIA.
ENLARGE 5-1 1/2" DIA. HOLES TO APPROX. 3 1/2" DIA.- TO VENT SHELTER. (HOLES MAY BE FLAME CUT). REMOVE ALL BURRS AND SHARP EDGES.
6"
10 7/8"
DRILL 11/16" DIAM. HOLES IF NOT EXISTING

ANTENNA PEDESTAL PLATE MK. P-22 MODIFIED MK. P-22-A



LADDER L21-MODIFIED - L21-A

NOTE:

ALL NEW STEEL PARTS ON THIS DRAWING TO BE GALVANIZED.

NO.	REVISION	DATE	CHECKED
5	5 1/4" CUT OFF LADDER TOP	1-17-51	
4	DIMENSIONED 11/16 DIAM. HOLES IN P-22-A	10-24-50	
3	CHANGED NOTE ON P-22-A	9-28-50	
2	ADDED LADDER AND MINOR DETAILS	7-20-50	
1	DELETED LADDER DETAILS	5-8-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
TERNE PLATE COUNTERPOISE
MODIFICATION OF STEEL MEMBERS
(OCTAGONAL FRAMING)

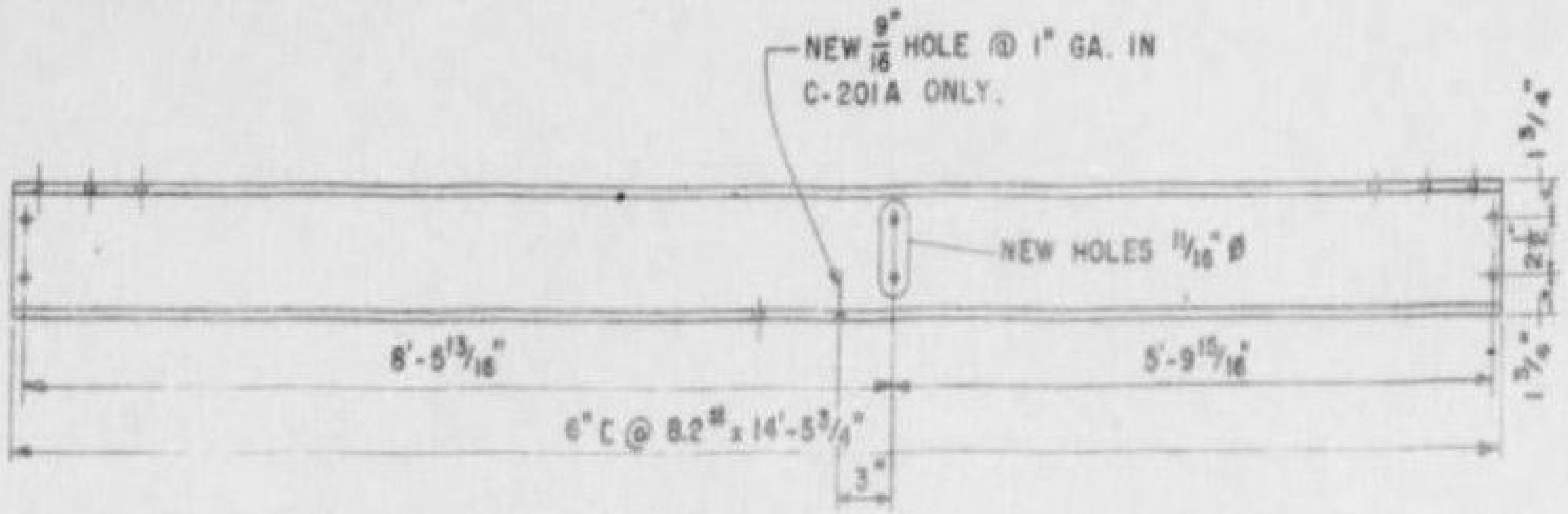
APPROVED: for R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH

SUBMITTED BY: Frank H. Grayson
CHIEF OF SECTION

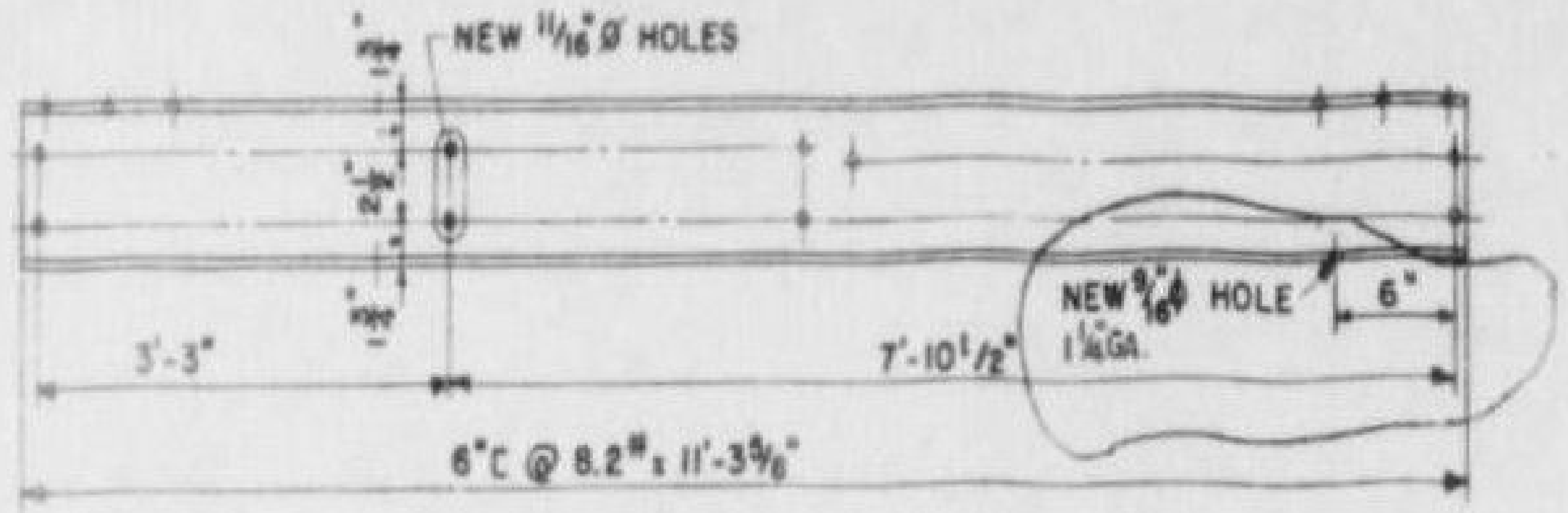
CHECKED: DESIGNED: DRAWN: A.C.W.
TRACED: F.S.K. DATE: 5-31-50

DR. D- 4733-6

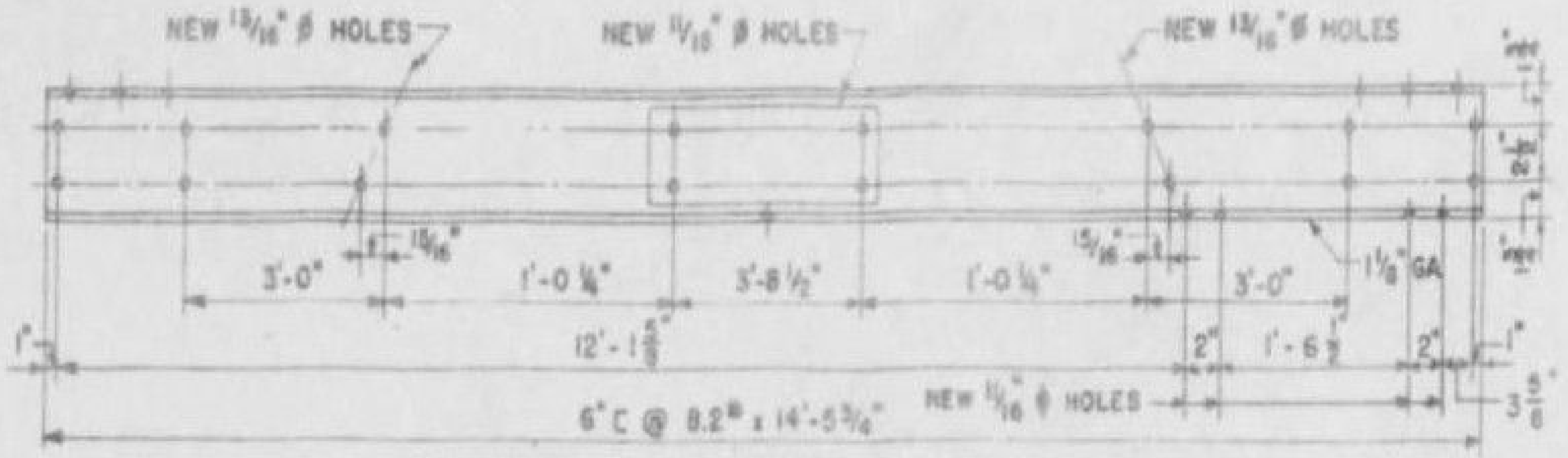
23133



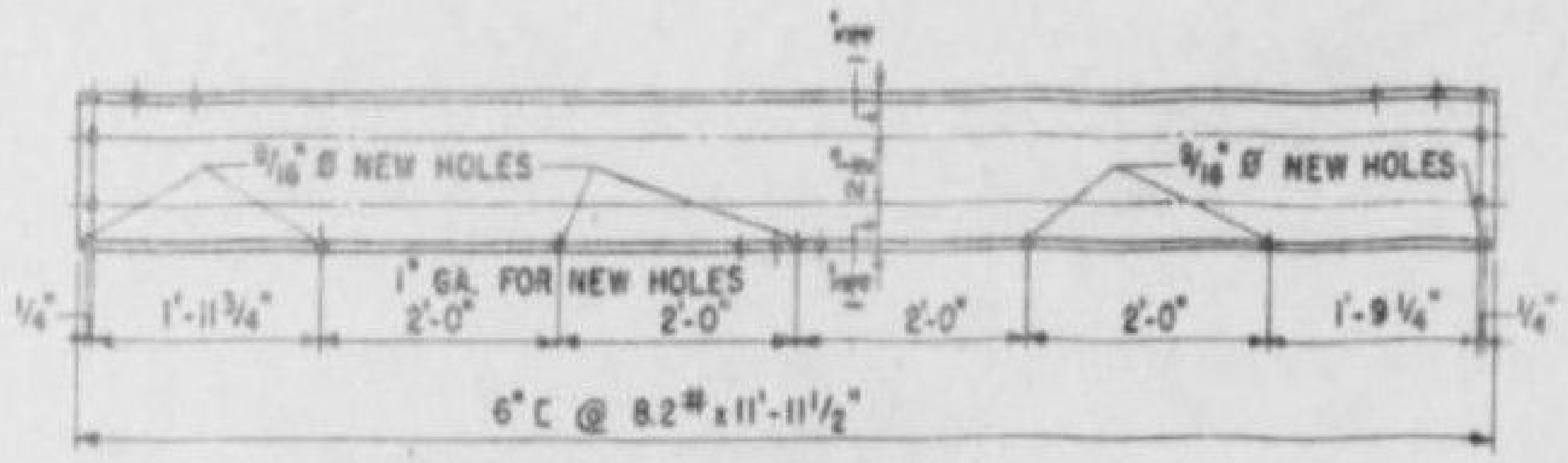
2-CHANNELS MK-C201 - AS SHOWN - MODIFIED MK-C201-A
2-CHANNELS MK-C201 OPP. HAND - MODIFIED MK-C201-B



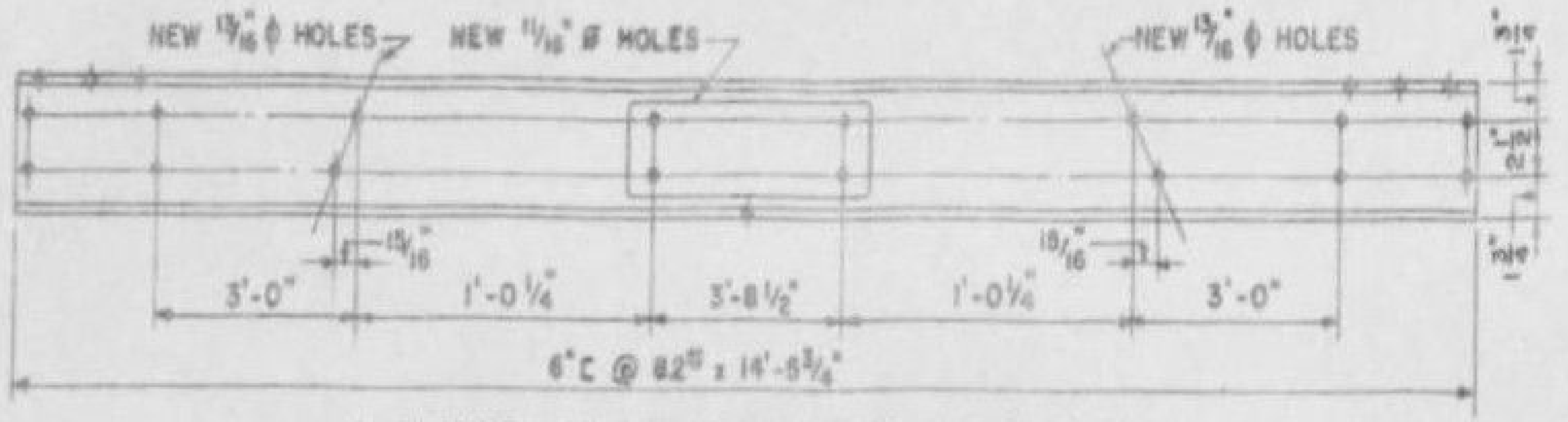
2-CHANNELS-MK-C207- AS SHOWN - MODIFIED MK-C207-B
2-CHANNELS-MK-C208- OPP. HAND - MODIFIED MK-C208-B



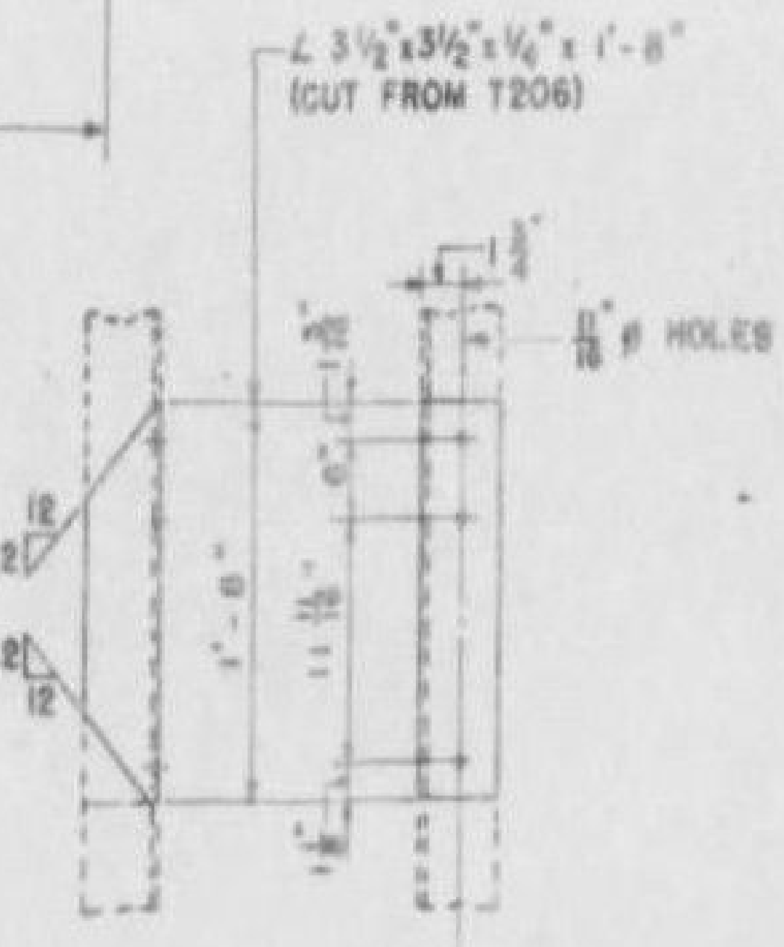
1-CHANNEL MK-C202 - MODIFIED - MK-C202-A



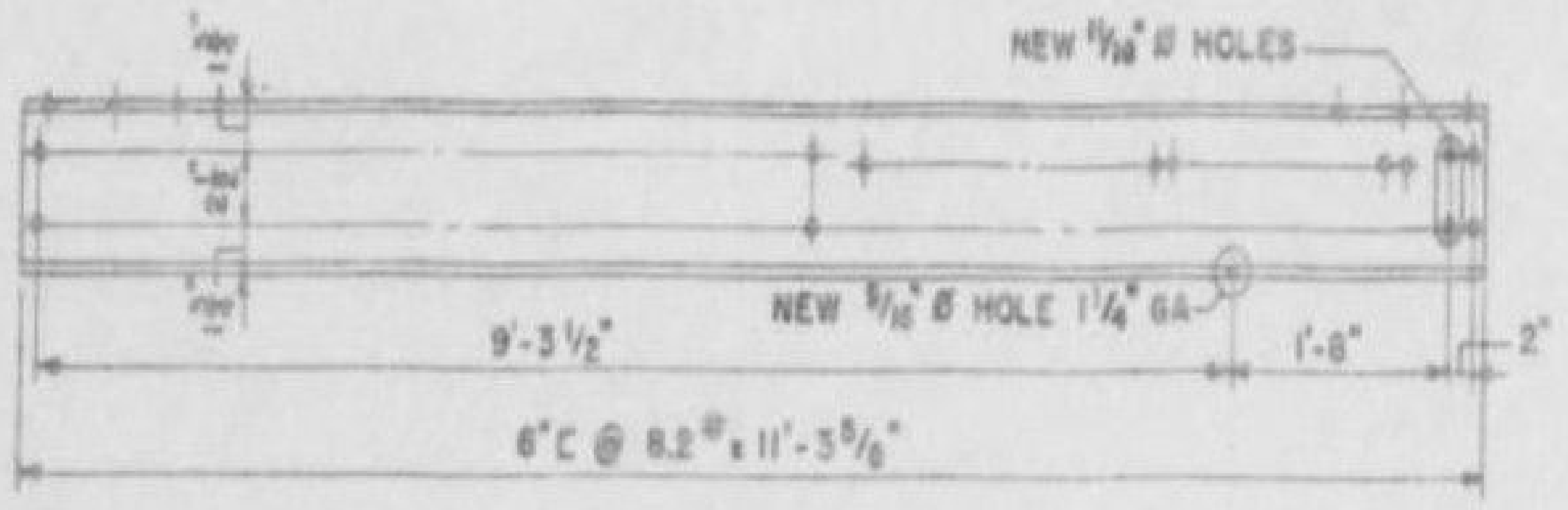
1-CHANNEL - MK-C211 - MODIFIED - MK-C211-A



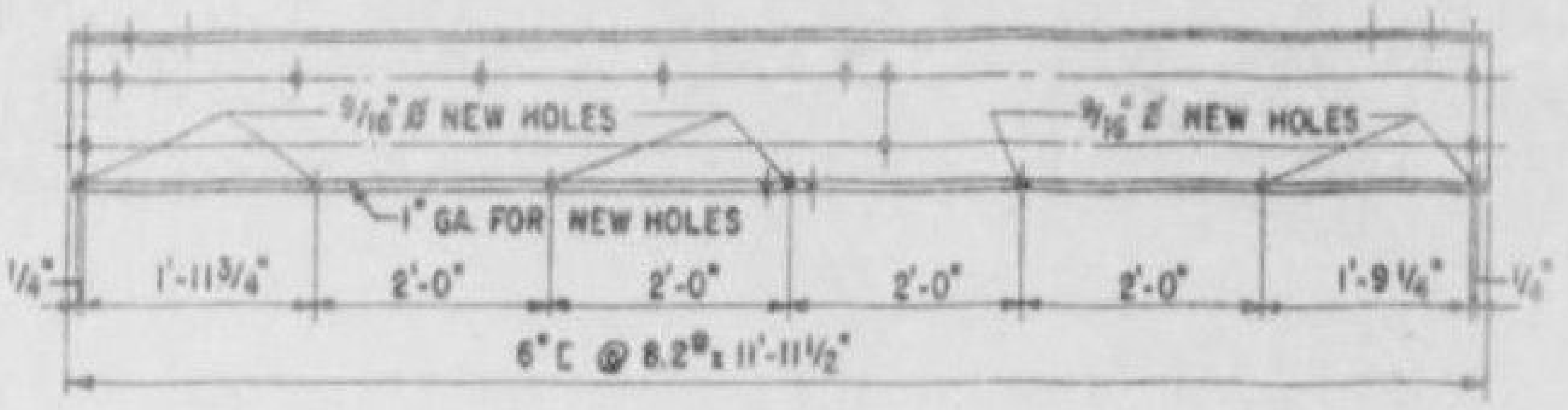
1-CHANNEL MK C202 - MODIFIED - MK-C202-B



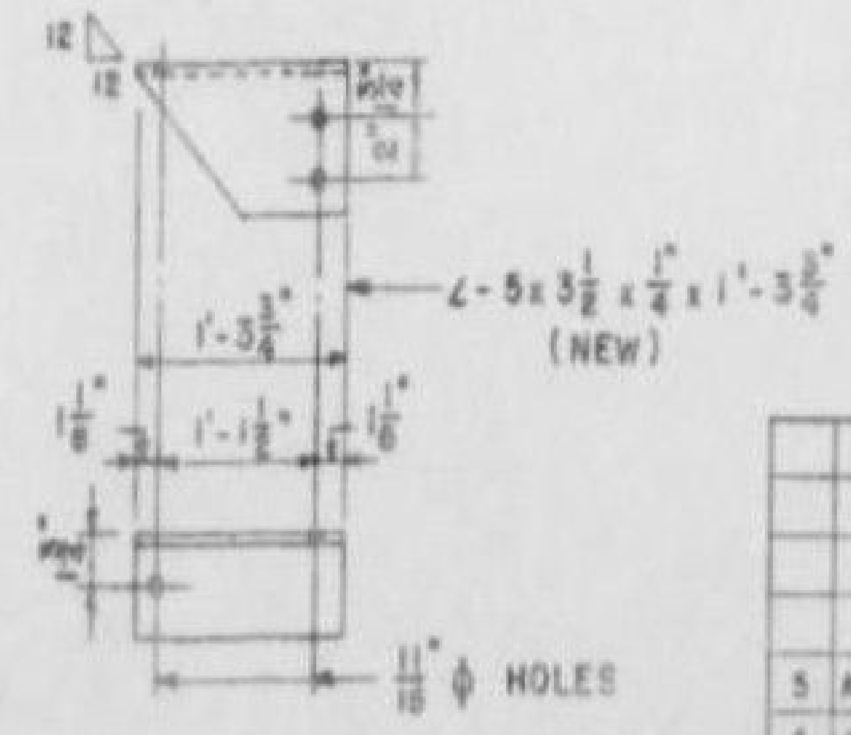
1 ANGLE MK-T206, MODIFIED MK-T206-D AS SHOWN
1 ANGLE MK-T206, MODIFIED MK-T206-E OPP. HAND



2-CHANNELS MK-C207 - AS SHOWN - MODIFIED MK-C207-A
1-CHANNEL - MK-C208 - OPP. HAND - MODIFIED MK-C208-A
1-CHANNEL MK-C209 - OPP. HAND - MODIFIED MK-C209-A

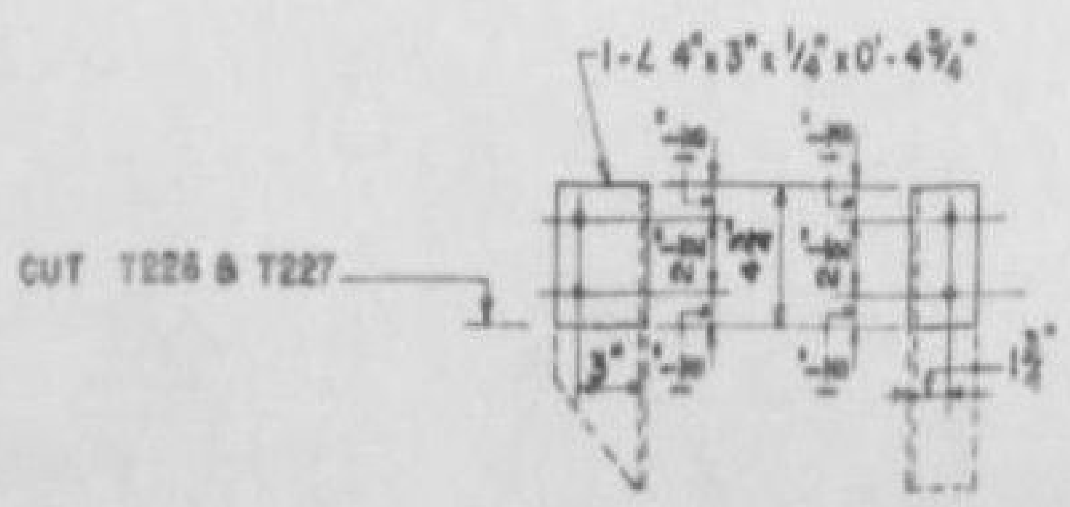


1-CHANNEL - MK-C212 - MODIFIED - MK-C212-A



NOTE:

ALL NEW STEEL PARTS ON THIS DRAWING TO BE GALVANIZED.



2-ANGLES MK-T226-MODIFIED MK-T226-A
2-ANGLES MK-T227-MODIFIED MK-T227-A

1-ANGLE, NEW MK-N3^R - AS SHOWN
1-ANGLE, NEW MK-N3^L - OPP. HAND

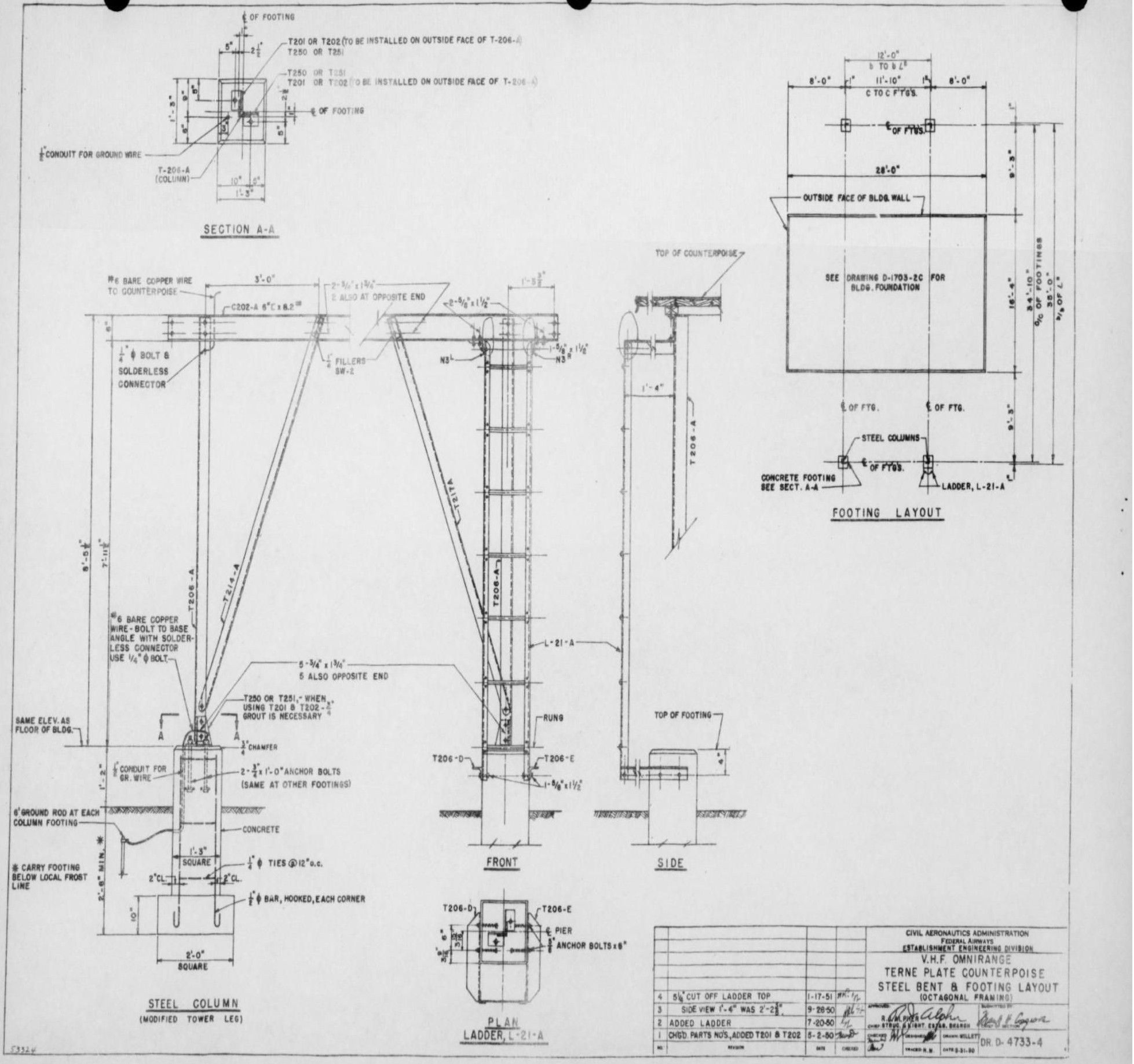
NO.	REVISION	DATE	CHECKED
5	ADDED HOLE TO C207-B AND C208-B	8-1-51	
4	ADDED HOLE IN C-201A	1-17-51	
3	REVISED N3$^{R\&L}$, T206-D & E	9-28-50	
2	ADDED LADDER DETAILS	7-20-50	
1	DELETED LADDER DETAILS	5-18-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
TERNE PLATE COUNTERPOISE
MODIFICATION OF STEEL MEMBERS
(OCTAGONAL COUNTERPOISE)

R. J. ALPHER
CHIEF STRUC. & LIGHT ESTAB. BRANCH
DRAWN A C W
TRACED DT
DATE 3-31-50
DR. D-4733-5

53324

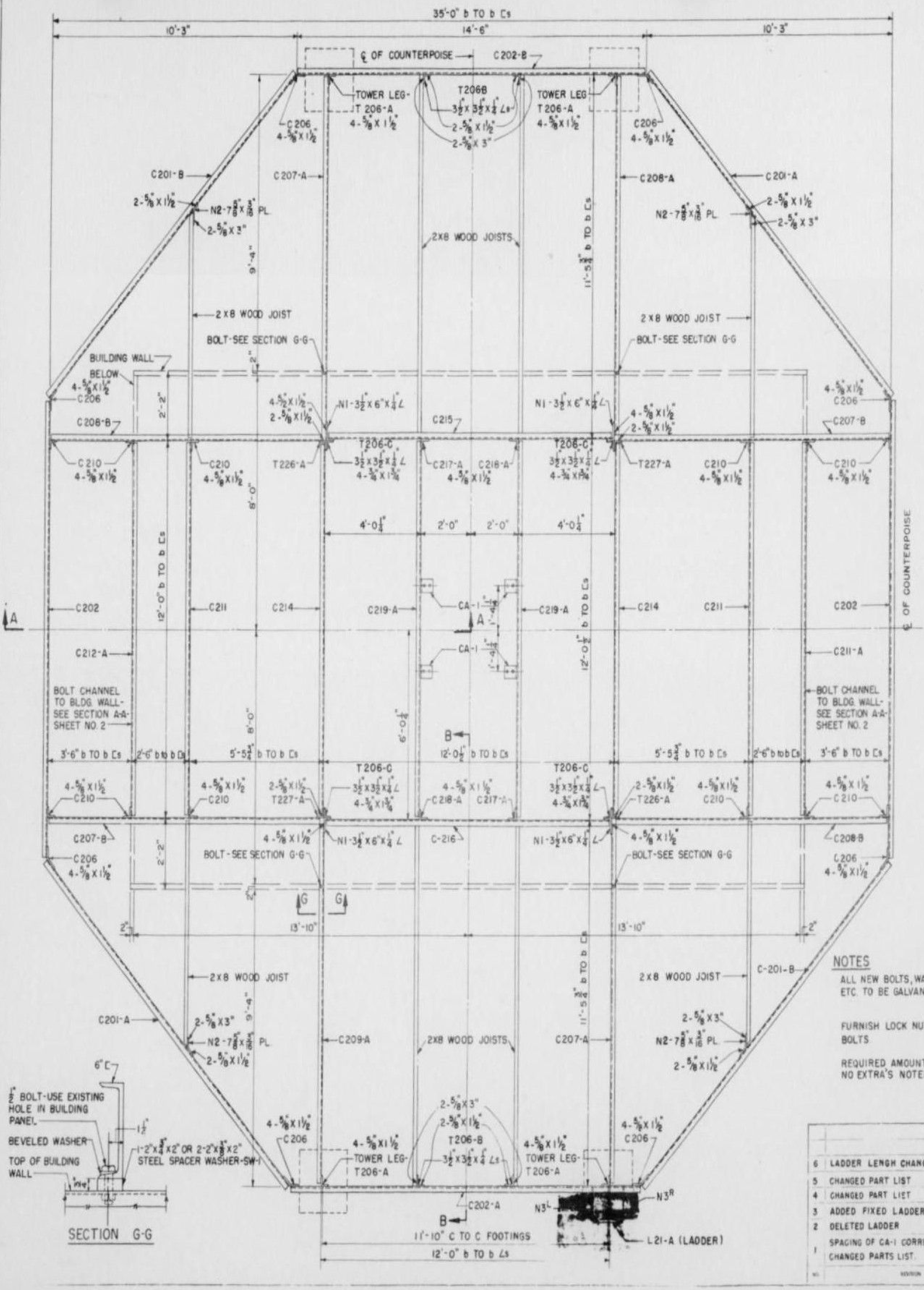


NO.	REVISION	DATE	CHECKED
4	5 1/4" CUT OFF LADDER TOP	1-17-51	
3	SIDE VIEW 1'-4" WAS 2'-2 1/2".	9-28-50	
2	ADDED LADDER	7-20-50	
1	CHGD. PARTS NO'S, ADDED T201 & T202	5-2-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F. OMNIRANGE
TERNE PLATE COUNTERPOISE
STEEL BENT & FOOTING LAYOUT
(OCTAGONAL FRAMING)

APPROVED R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY
CHECKED
DESIGNED
DRAWN WILLETT
TRACED R. M.
DATE 3-31-50
DR. D- 4733-4



PARTS LIST - ONE COUNTERPOISE

	MARK	NO. REQ'D	DESCRIPTION	LENGTH	REMARKS
	C201-A	2	C-6" @ 8.2#	14'-5 3/4"	MODIFIED FROM C201
	C201-B	2	C-6" @ 8.2#	14'-5 3/4"	MODIFIED FROM C201
	C202	2	C-6" @ 8.2#	14'-5 3/4"	EXISTING
	C202-A	1	C-6" @ 8.2#	14'-5 3/4"	MODIFIED FROM C202
	C206	8	PL.-4 1/2" X 3/16"	0'-4 1/4"	EXISTING
	C207-A	2	C-6" @ 8.2#	11'-3 5/8"	MODIFIED FROM C207
	C207-B	2	C-6" @ 8.2#	11'-3 5/8"	MODIFIED FROM C207
	C208-A	1	C-6" @ 8.2#	11'-3 5/8"	MODIFIED FROM C208
	C208-B	2	C-6" @ 8.2#	11'-3 5/8"	MODIFIED FROM C208
	C209-A	1	C-6" @ 8.2#	11'-3 5/8"	MODIFIED FROM C209
	C210	12	CLIP L-2 1/2"X 2 1/2"X 3/16"	0'-4 1/2"	EXISTING
	C211	2	C-6" @ 8.2#	11'-11 1/2"	EXISTING
	C211-A	1	C-6" @ 8.2#	11'-11 1/2"	MODIFIED FROM C211
	C212-A	1	C-6" @ 8.2#	11'-11 1/2"	MODIFIED FROM C212
	C214	2	C-6" @ 8.2#	11'-10 3/4"	EXISTING
	C215	1	C-6" @ 8.2#	11'-10 3/4"	EXISTING
	C216	1	C-6" @ 8.2#	11'-10 3/4"	EXISTING
	C217-A	2	CLIP L-2 1/2"X 2 1/2"X 3/16"	0'-4 1/2"	MODIFIED FROM C217
	C218-A	2	CLIP L-2 1/2"X 2 1/2"X 3/16"	0'-4 1/2"	MODIFIED FROM C218
	C219-A	2	C-6" @ 8.2#	12'-0"	MODIFIED FROM C219
	T206-A	4	L-3 1/2"X 3 1/2"X 1/4"	8'-4"	MODIFIED FROM T206
	T214-A	2	L-2 1/2"X 2 1/2"X 1/4"	8'-3 9/16"	MODIFIED FROM T214
	T217-A	2	L-2 1/2"X 2 1/2"X 1/4"	8'-3 9/16"	MODIFIED FROM T217
	T226-A	2	CLIP L-4"X 3"X 1/4"	0'-4 3/4"	MODIFIED FROM T226
	T227-A	2	CLIP L-4"X 3"X 1/4"	0'-4 3/4"	MODIFIED FROM T227
D-2774-E SERIES ONLY	T250	4	BASE PLs-5 1/8"X 1/2"	1'-1 3/4"	EXISTING
	T251	4	BASE PLs-5 1/8"X 1/2"	1'-1 3/4"	EXISTING
	T206-B	4	CLIP L-3 1/2"X 3 1/2"X 1/4"	0'-4 3/4"	CUT FROM T206
	N1	4	CLIP L-3 1/2"X 6"X 1/4"	0'-4 3/4"	NEW
	T206-C	4	CLIP L-3 1/2"X 3 1/2"X 1/4"	0'-4 1/2"	CUT FROM T206
	N2	4	PL-7 5/8"X 3/16"	0'-4 1/2"	NEW
	CA-1	4	CASTER ASSEMBLY		EXISTING
	P22-A	1	CIRCULAR PLATE		MODIFIED FROM P22
	SW-1	4	SPACER WASHERS	2" SQ. x 3/4" - 9/16" Ø HOLE	NEW
	C202-B	1	C-6" @ 8.2#	14'-5 3/4"	MODIFIED FROM C202
	SW-2	4	FILLER PLATES	2" x 1/4" x 4" - 13/16" Ø HOLES	NEW
D-2774-B AND D SERIES ONLY	T201	4	C-10" @ 15.3	0'-5 1/2"	EXISTING
	T202	4	C-10" @ 15.3	0'-5 1/2"	EXISTING
	CA 2	1	ANGLE FRAME		EXISTING
	L21-A	1	LADDER	8'-4 3/4"	MODIFIED FROM L21
	N3R	1	L-5 x 3 1/2 x 1/4	1'-3 3/4"	NEW
	N3L	1	L-5 x 3 1/2 x 1/4	1'-3 3/4"	NEW
	T206-D	1	L-3 1/2 x 3 1/2 x 1/4	1'-8"	MODIFIED FROM T206
	T206-E	1	L-3 1/2 x 3 1/2 x 1/4	1'-8"	MODIFIED FPOM T206
	N5	2	HAND GRIP (LADDER)	SEE DETAIL ON SHEET 6	

	NO. REQUIRED	DESCRIPTION
USE FROM EXISTING INSTALLATION	98 EACH	3/8" Ø HEX NUTS & WASHERS
	208 EACH	5/8" Ø HEX NUTS & WASHERS
	8	5/8" Ø X 1" LG. BOLTS
	184	5/8" Ø X 1 1/2" LG. BOLTS
	62 EACH	3/4" Ø HEX NUTS & WASHERS
	44	3/4" Ø X 1 3/4" LG. BOLTS
NEW	18	3/8" Ø X 4" LG. SQ. HD. BOLTS
	18	1/2" Ø X 1 1/2" LG. SQ. HD. BOLTS, WITH HEX. NUTS & WASHERS
	11	1/2" Ø X 2 1/2" LG. SQ. HD. BOLTS, WITH HEX. NUTS & WASHERS
	36	1/2" Ø X 2 3/4" LG. SQ. HD. BOLTS, WITH HEX. NUTS & WASHERS
	4	BEVEL WASHERS - 13/16" Ø HOLE
	16	5/8" Ø X 3" LG. SQ. HD. BOLTS
	4	5/8" Ø X 6" LG. SQ. HD. ANCHOR BOLTS
	8	3/4" Ø X 12" LG. SQ. HD. ANCHOR BOLTS
	80	3/8" Ø X 2 1/2" LG CARRIAGE BOLTS

NOTES

ALL NEW BOLTS, WASHERS, SPACERS ETC. TO BE GALVANIZED.

FURNISH LOCK NUTS FOR ALL BOLTS.

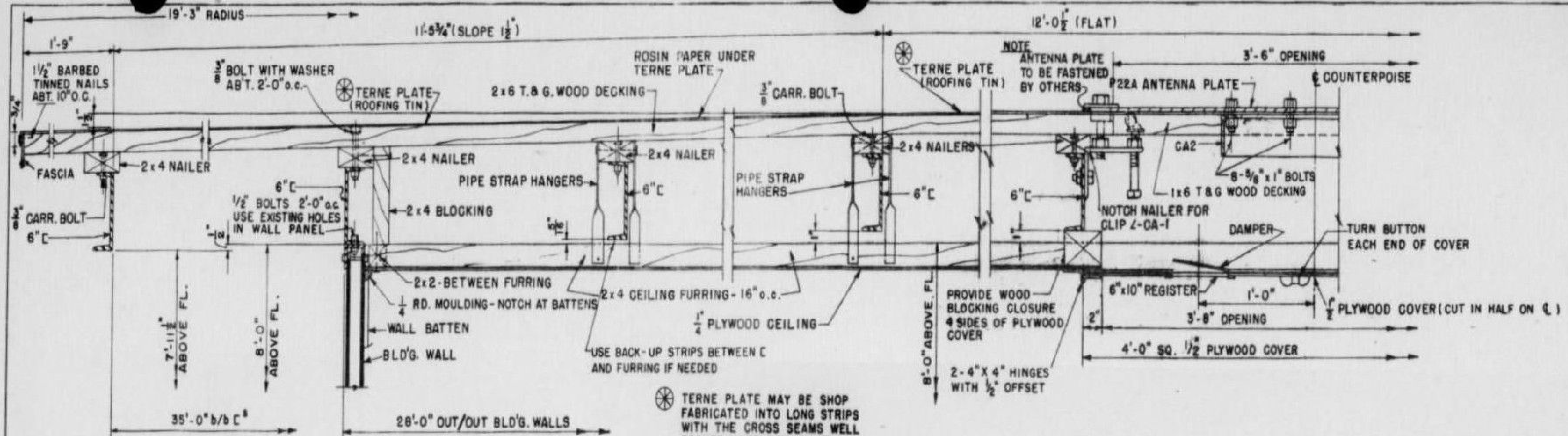
REQUIRED AMOUNT SHOWN - NO EXTRA'S NOTED.

NO.	REVISION	DATE	CHECKED
6	LADDER LENGH CHANGED	1-17-51	
5	CHANGED PART LIST	10-24-50	
4	CHANGED PART LIST	9-28-50	
3	ADDED FIXED LADDER & BOLT LIST	7-20-50	
2	DELETED LADDER	5-18-50	
1	SPACING OF CA-1 CORRECTED, AND CHANGED PARTS LIST	5-2-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

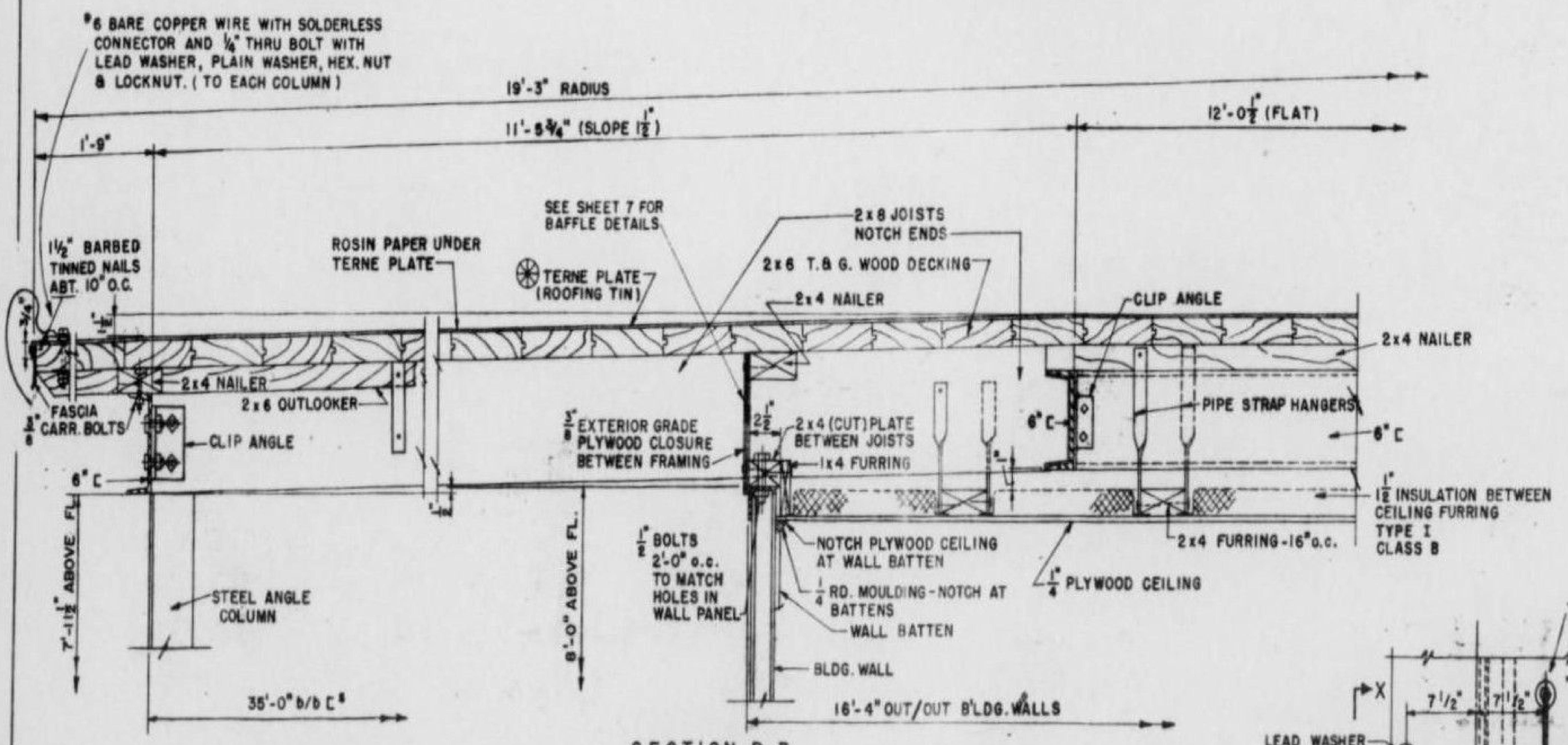
V.H.F. OMNIRANGE
TERNE PLATE COUNTERPOISE
STEEL ERECTION
(OCTAGONAL FRAMING)

APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT/ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
CHECKED
DESIGNED
DRAWN T.G.S.
TRACED E.W.G.
DATE 3-31-50
DR. D-4733-3

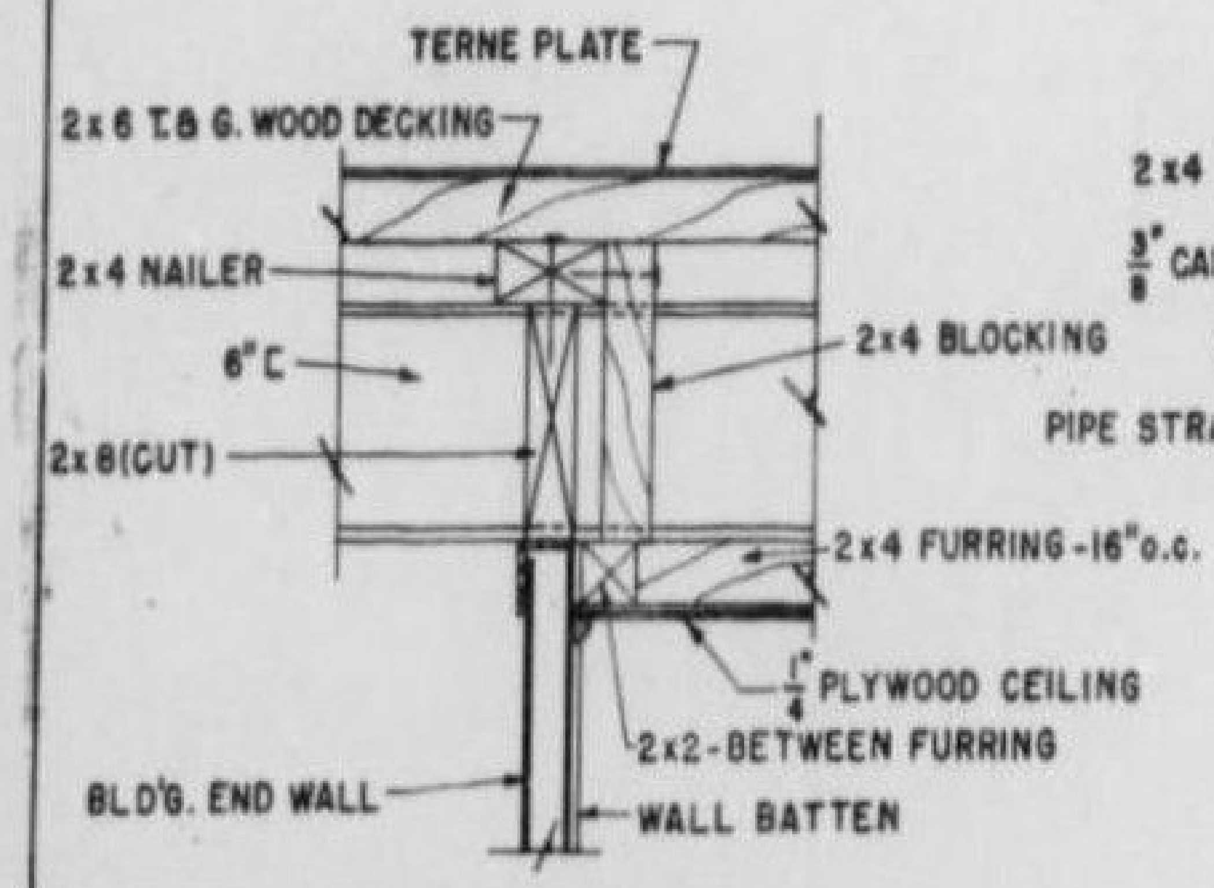

19'-3" RADIUS
11'-5¾" (SLOPE 1½")
12'-0½" (FLAT)
1'-9"
1½" BARBED TINNED NAILS ABT. 10" O.C.
⅜" BOLT WITH WASHER AB'T. 2'-0" o.c.
ROSIN PAPER UNDER TERNE PLATE
TERNE PLATE (ROOFING TIN)
2x6 T.& G. WOOD DECKING
⅜" CARR. BOLT
NOTE ANTENNA PLATE TO BE FASTENED BY OTHERS
P22A ANTENNA PLATE
3'-6" OPENING
℄ COUNTERPOISE
FASCIA
2x4 NAILER
2x4 NAILERS
PIPE STRAP HANGERS
6"[
⅜" CARR. BOLT
½" BOLTS 2'-0" o.c. USE EXISTING HOLES IN WALL PANEL
2x4 BLOCKING
CA2
8-⅝" x 1" BOLTS
1x6 T&G WOOD DECKING
NOTCH NAILER FOR CLIP ∠-CA-1
DAMPER
TURN BUTTON EACH END OF COVER
2x2-BETWEEN FURRING
¼ RD. MOULDING-NOTCH AT BATTENS
2x4 CEILING FURRING-16" o.c.
¼" PLYWOOD CEILING
WALL BATTEN
BLD'G. WALL
USE BACK-UP STRIPS BETWEEN [AND FURRING IF NEEDED
PROVIDE WOOD BLOCKING CLOSURE 4 SIDES OF PLYWOOD COVER
6"x10" REGISTER
1'-0"
2"
3'-8" OPENING
½" PLYWOOD COVER (CUT IN HALF ON ℄)
4'-0" SQ. ½" PLYWOOD COVER
2-4" X 4" HINGES WITH ½" OFFSET
7'-11½" ABOVE FL.
8'-0" ABOVE FL.
8'-0" ABOVE FL.
35'-0" b/b [ˢ
28'-0" OUT/OUT BLD'G. WALLS

✻ TERNE PLATE MAY BE SHOP FABRICATED INTO LONG STRIPS WITH THE CROSS SEAMS WELL SOAKED IN SOLDER IN LIEU OF LAYING INDIVIDUAL SHEETS IN THE FIELD AS INDICATED IN THE APPLICABLE SPECIFICATION, OR 20" WIDE ROLL MATERIAL MAY BE USED IN LIEU OF SHEETS.

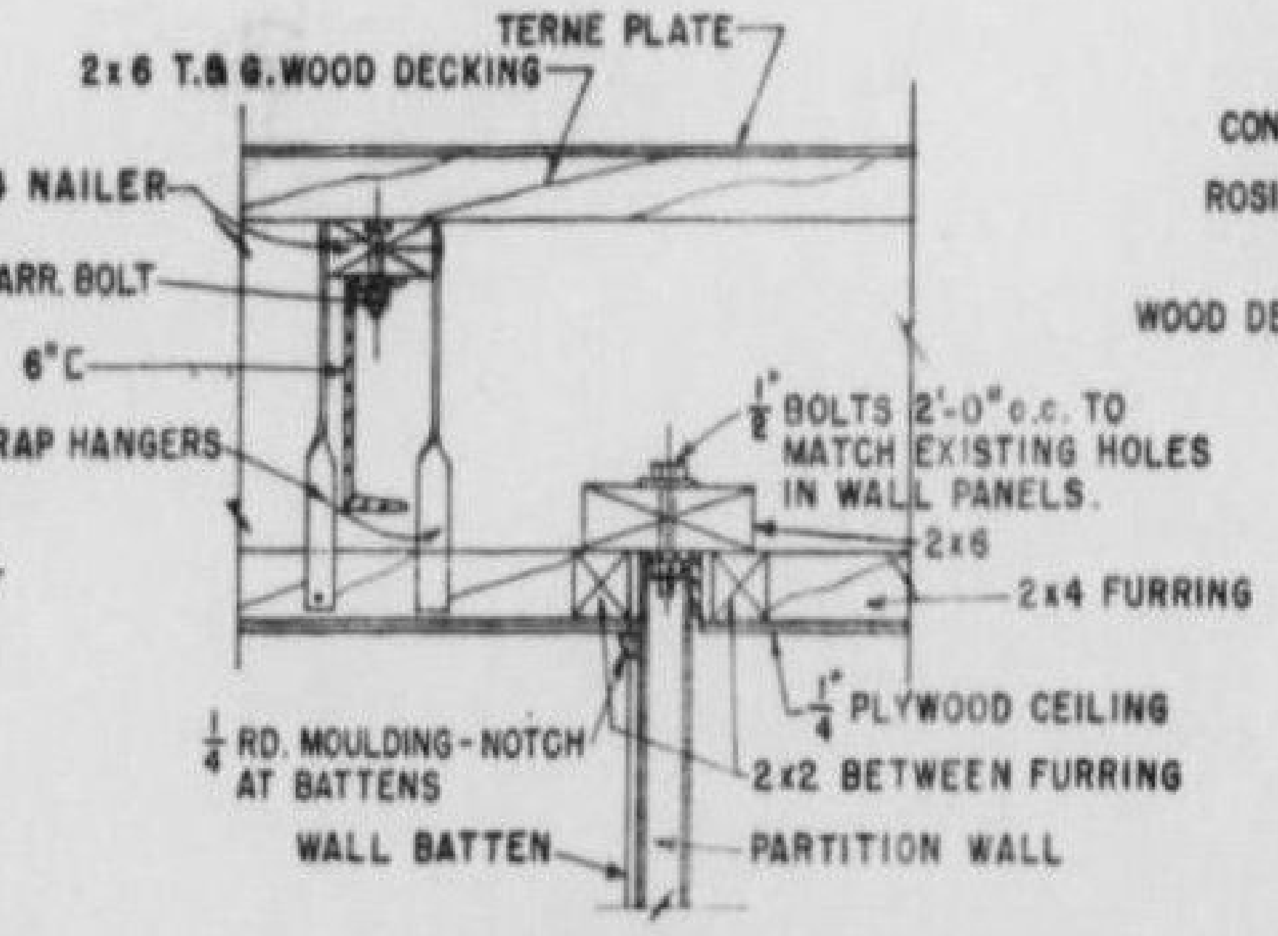
SECTION A-A


#6 BARE COPPER WIRE WITH SOLDERLESS CONNECTOR AND ¼" THRU BOLT WITH LEAD WASHER, PLAIN WASHER, HEX. NUT & LOCKNUT. (TO EACH COLUMN)
19'-3" RADIUS
11'-5¾" (SLOPE 1½")
12'-0½" (FLAT)
1'-9"
1½" BARBED TINNED NAILS ABT. 10" O.C.
ROSIN PAPER UNDER TERNE PLATE
SEE SHEET 7 FOR BAFFLE DETAILS
TERNE PLATE (ROOFING TIN)
2x8 JOISTS NOTCH ENDS
2x6 T.& G. WOOD DECKING
2x4 NAILER
CLIP ANGLE
2x4 NAILER
2x4 NAILER
2x6 OUTLOOKER
FASCIA
⅜" CARR. BOLTS
CLIP ANGLE
6"[
⅜" EXTERIOR GRADE PLYWOOD CLOSURE BETWEEN FRAMING
2½"
2x4 (CUT) PLATE BETWEEN JOISTS
1x4 FURRING
6"[
PIPE STRAP HANGERS
6"[
1½" INSULATION BETWEEN CEILING FURRING TYPE I CLASS B
½" BOLTS 2'-0" o.c. TO MATCH HOLES IN WALL PANEL
NOTCH PLYWOOD CEILING AT WALL BATTEN
¼ RD. MOULDING-NOTCH AT BATTENS
WALL BATTEN
2x4 FURRING-16" o.c.
¼" PLYWOOD CEILING
BLDG. WALL
STEEL ANGLE COLUMN
7'-11½" ABOVE FL.
8'-0" ABOVE FL.
35'-0" b/b [ˢ
16'-4" OUT/OUT B'LDG. WALLS

SECTION B-B

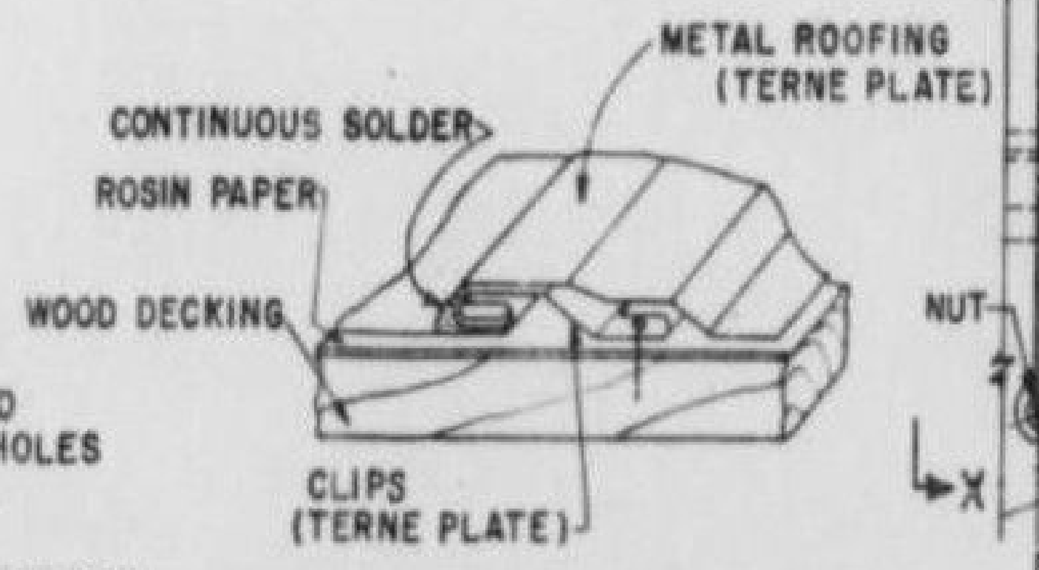


SECTION C-C

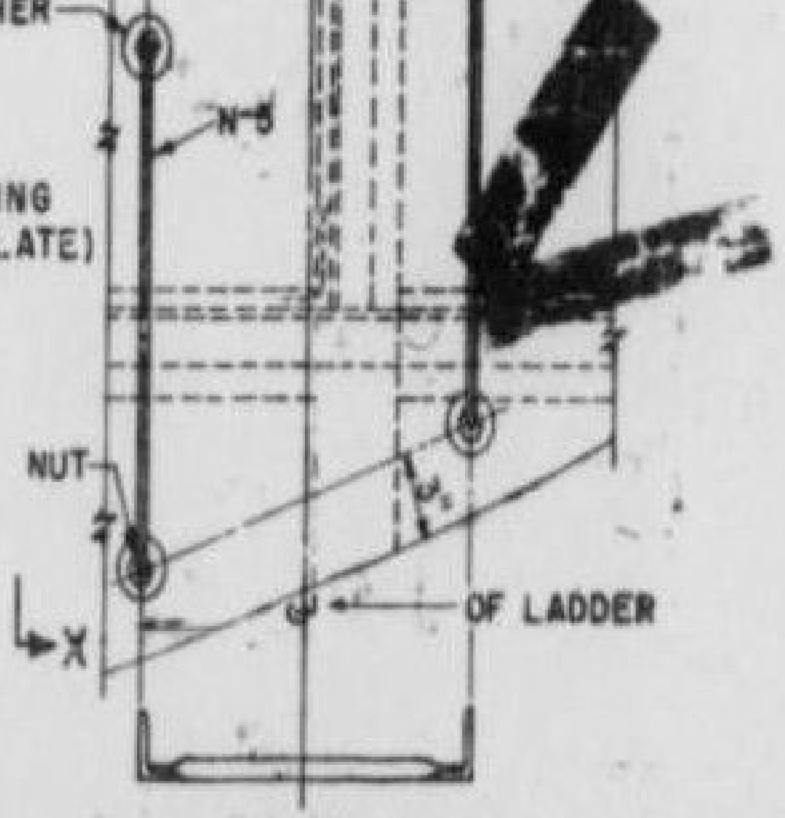


SECTION D-D

FOR PLAN SEE SHEET I

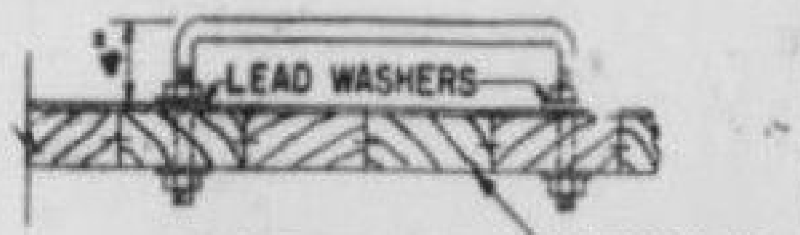


DETAIL-FLAT LOCK SEAM



PLAN

LADDER HAND GRIP



SECTION X-X

NO.	REVISION	DATE	CHECKED
6	ANTENNA PLATE SHOWN SOLID	4-16-52	
5	VENTS AND SECTIONS - SEE SHEET 7	1-17-51	
4	HAND GRIP - TERNE PLATE - ANTENNA OP'G.	9-28-50	
3	REVISED LADDER, ~~MINOR REVISIONS~~	7-20-50	
2	OCTAGONAL TO CIRCULAR DECKING	5-18-50	
1	CORRECTED STEEL MEMBER MARK NO'S.	5-2-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

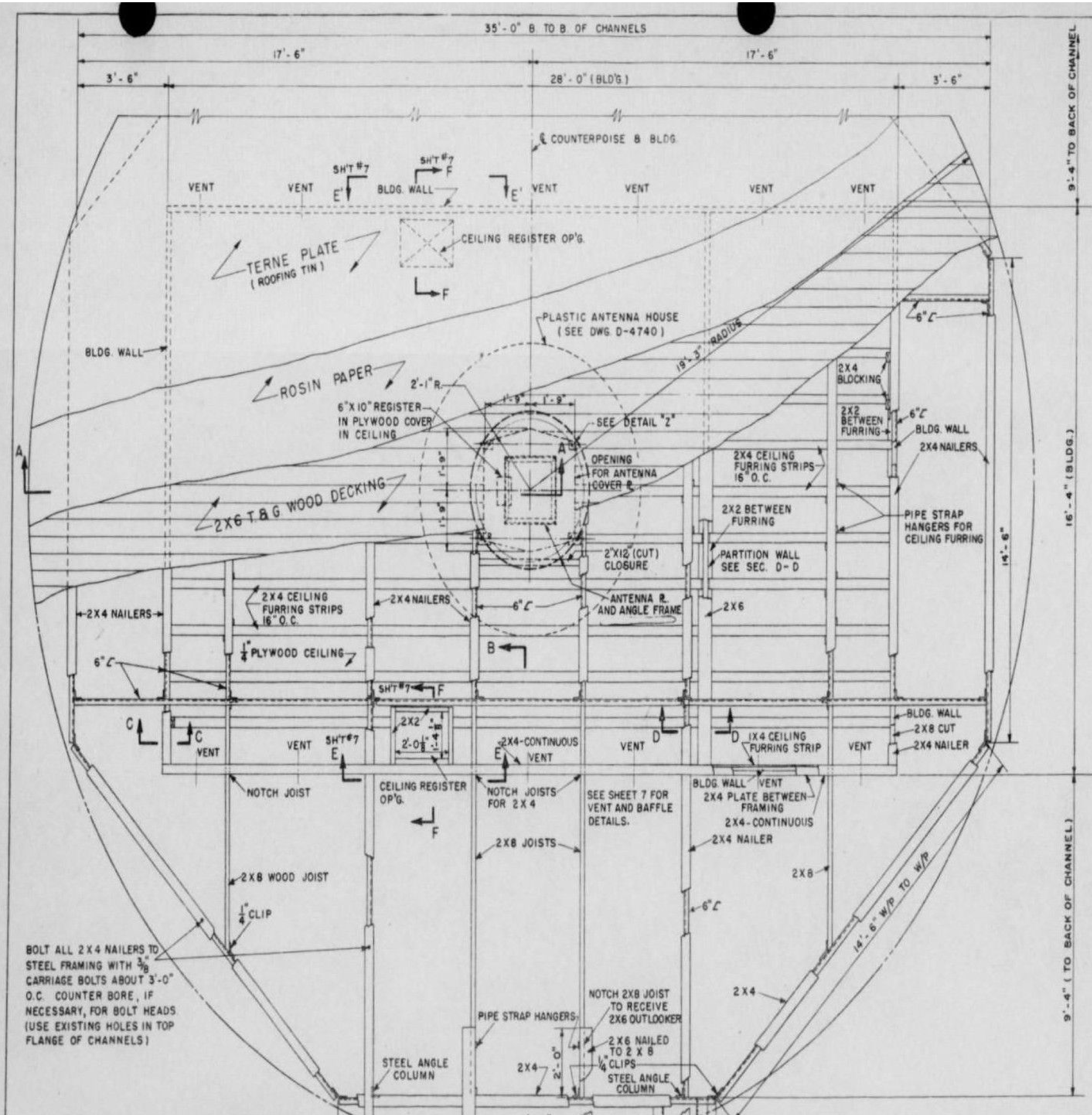
V.H.F. OMNIRANGE
TERNE PLATE COUNTERPOISE
SECTIONS
(OCTAGONAL FRAMING)

APPROVED: R. J. Alpher
R.J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH

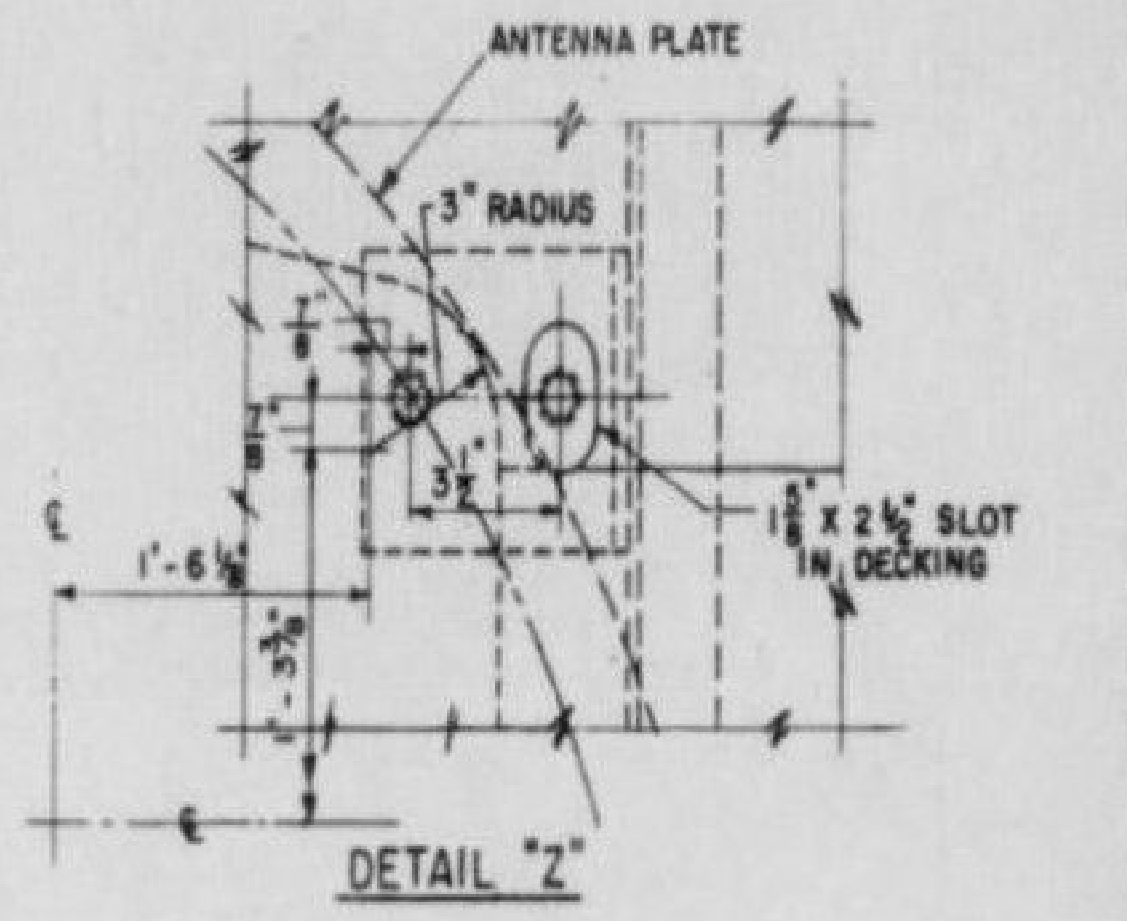
SUBMITTED BY:
CHIEF OF SECTION

CHECKED
DESIGNED
DRAWN D.B.C.
TRACED K.B.
DATE 3-31-50

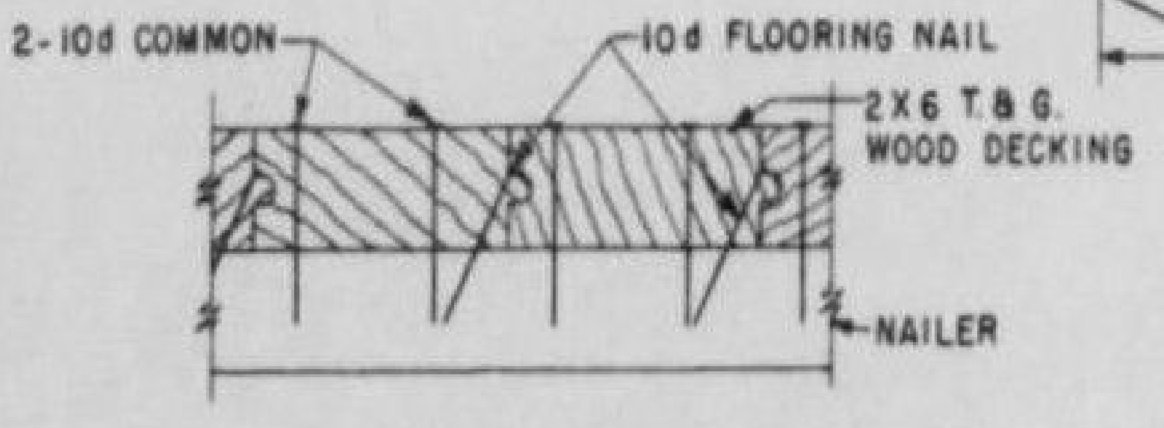
DR. D-4733-2



PLAN



DETAIL "Z"



TYPICAL DECK NAILING

REFERENCE DRAWINGS (EXISTING STRUCTURES)

1. BUILDING:
   - A. PLAN & ELEVATION C-1701-2B
   - B. ERECTION D-1702-2B
   - C. ELECTRICAL D-1702-2A
   - D. FOUNDATION D-1703-2C
2. TOWER:
   - A. ERECTION & FABRICATION .... D-2774-B SERIES
D-2774-D SERIES
D-2774-E SERIES
3. ANTENNA SHELTER (WOOD) D-4379

NOTES:

1. TOWER AND ANTENNA SHELTER
   - A. DISMANTLE EXISTING TOWER AND ANTENNA SHELTER DISPOSE OF AS DIRECTED EXCEPT FOR PARTS TO BE USED AS SHOWN ON THE DRAWINGS.
   - B. EXISTING TOWER FOOTINGS TO BE LEVELED TO THE THE GROUND.
   - C. STEEL PARTS USED IN NEW STRUCTURE TO BE TOUCHED UP WITH ALUMINUM PAINT WHERE GALVANIZING HAS BEEN REMOVED. FED. SPEC. TT-A-468
2. BUILDING:
   - A. REMOVE ROOF FROM EXISTING BUILDING, INCLUDING TRUSSES, KNEE BRACES, GABLE PANELS, AND CEILING CONDUITS.
   - B. REMOVE CEILING CONDUITS, MODIFY AS REQUIRED.
   - C. MODIFY VENTILATION AS REQUIRED.

REFERENCE DRAWINGS

(NEW AND MODIFIED STRUCTURES)

1. BUILDING:
   - A. PLAN & ELEVATION D-1701-2AC
   - B. ERECTION D-1702-4B
   - C. ELECTRICAL D-1702-4BA
   - D. FOUNDATION D-1703-2C
2. TERNE PLATE COUNTERPOISE (OCTAGONAL FRAMING)
   - A. PLAN D-4733-1
   - B. SECTIONS D-4733-2
   - C. STEEL ERECTION D-4733-3
   - D. STEEL BENT & FOOTING LAYOUT D-4733-4
   - E. MODIFICATION OF STEEL MEMBERS D-4733-5
   - F. MODIFICATION OF STEEL MEMBERS D-4733-6
   - G. VENTILATION DETAILS D-4733-7
3. PLASTIC ANTENNA SHELTER D-4740

NO.	REVISION	DATE	CHECKED
6	REMOVED "BY OTHERS"	4-16-52	
5	VENT HOLES BETWEEN JOISTS	1-17-51	
4	ANTENNA PLATE OPENING REVISED	9-28-50	
3	REV. LADDER, DELETED SPECS.	7-20-50	
2	OCTAGONAL TO CIRCULAR DECKING	5-18-50	
1	CHANGED EXISTING REF. DWG. NO'S. ADDED CLOSURE	5-2-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F. OMNIRANGE
TERNE PLATE COUNTERPOISE
PLAN
(OCTAGONAL FRAMING)

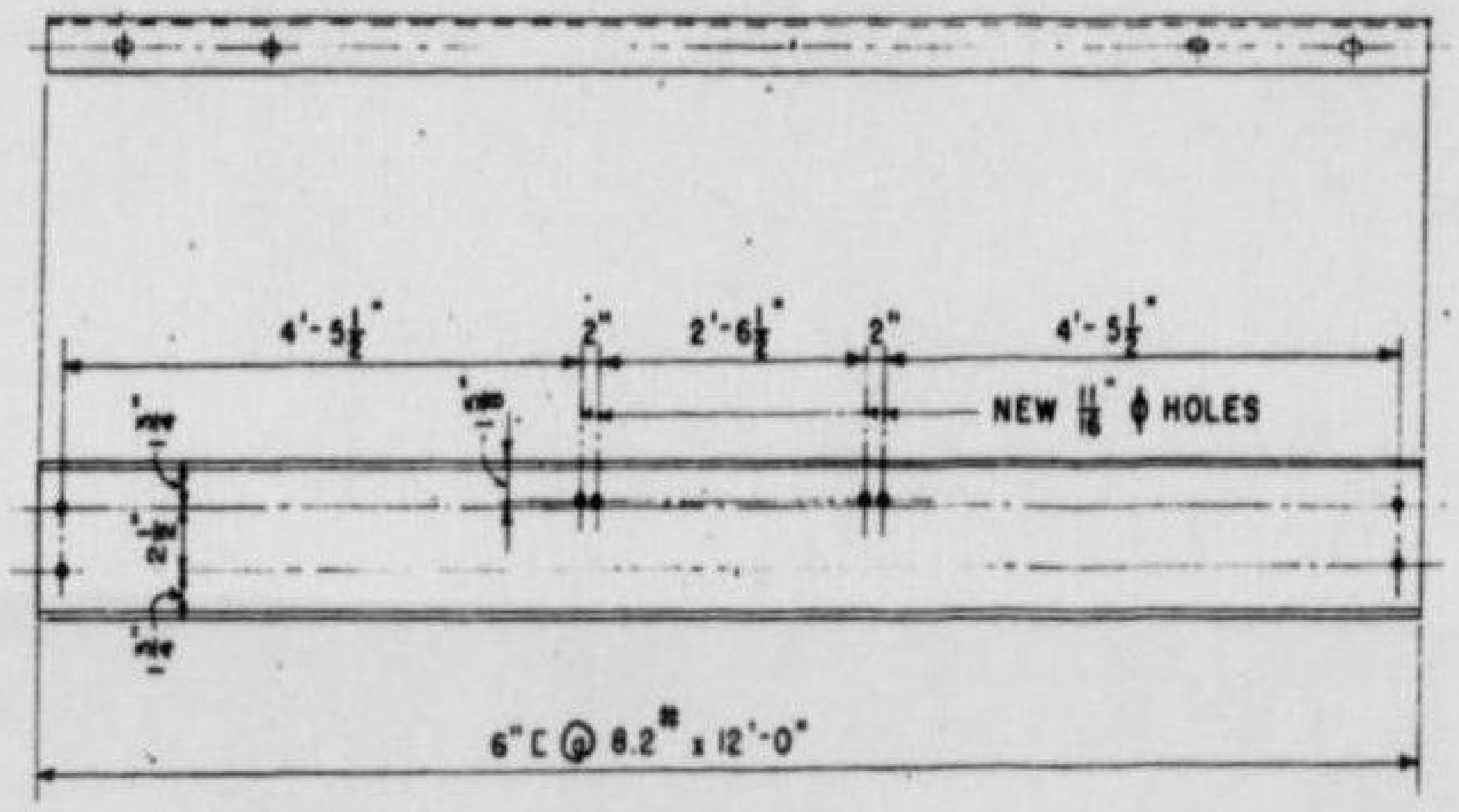
APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH

SUBMITTED BY: Frank H. Cozens
CHIEF OF SECTION

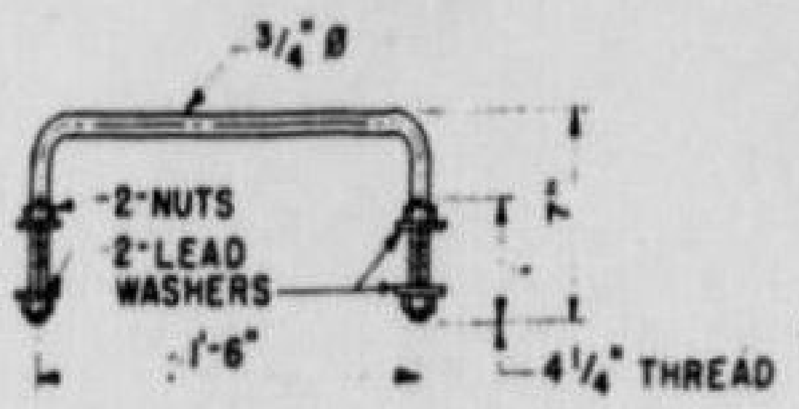
CHECKED:
DESIGNED:
DRAWN: D.G.C.
TRACED:
DATE: 3-31-50

DR. D-4733-1

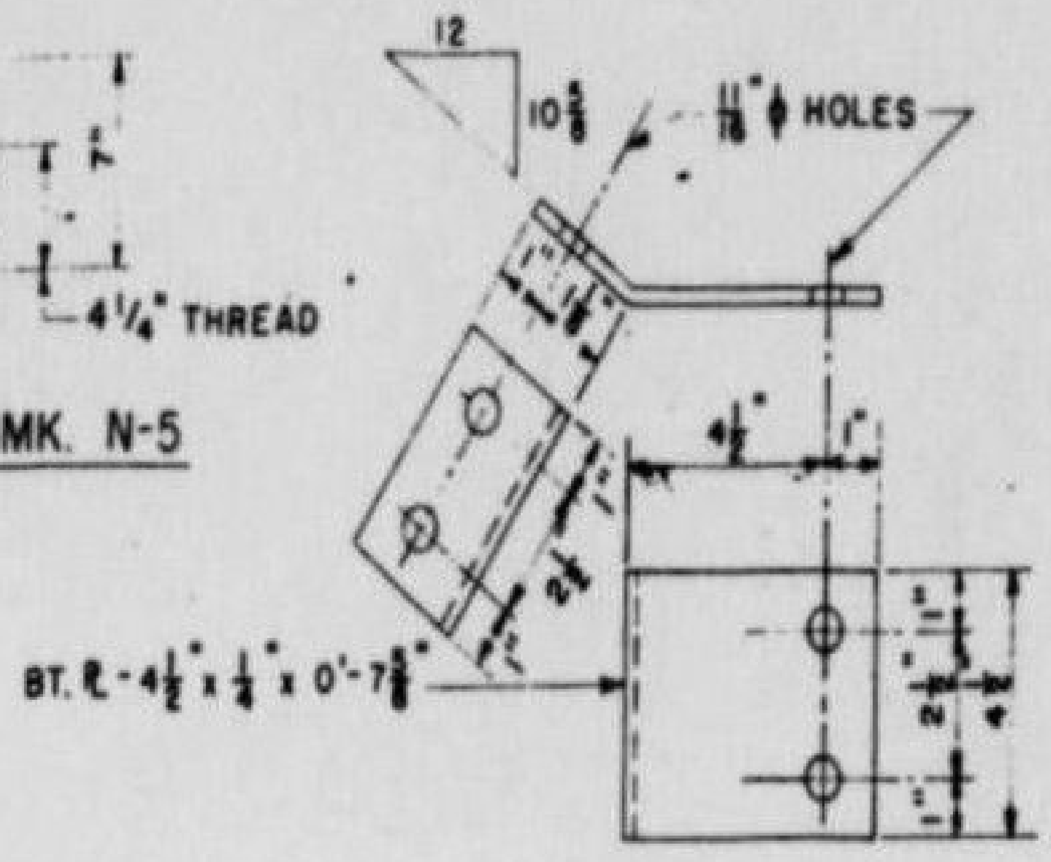
53119



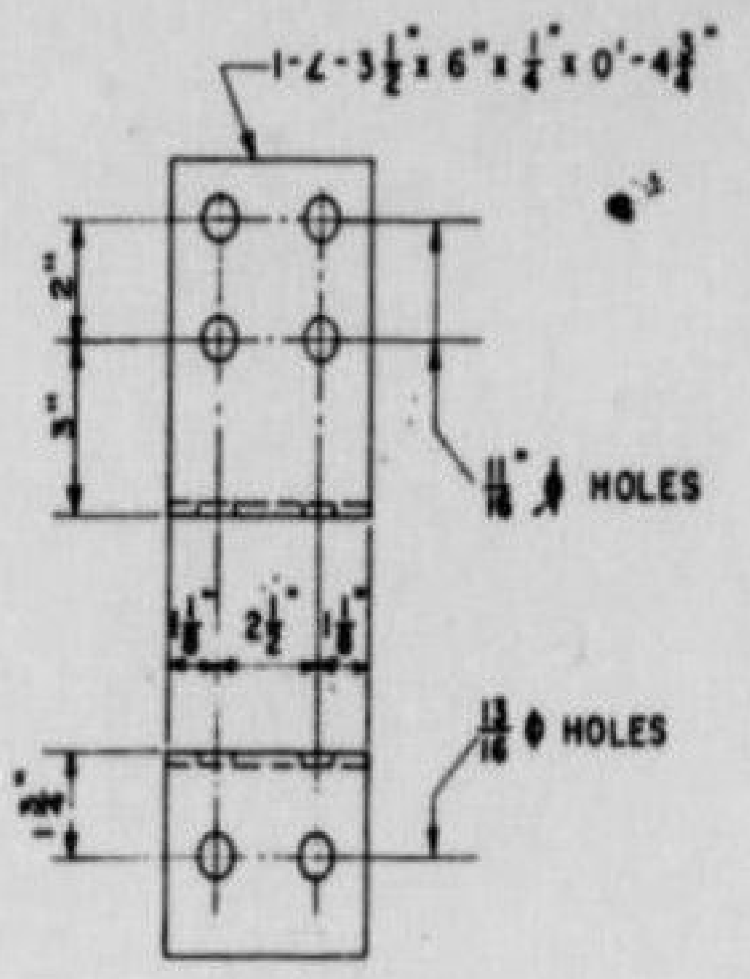
2-CHANNELS - MK-C108 - MODIFIED - MK-C108-A
OR
2-CHANNELS - MK-C-48 - MODIFIED - MK-C-48-A
OR
2-CHANNELS - MK-BK-1 - MODIFIED - MK-BK1-A



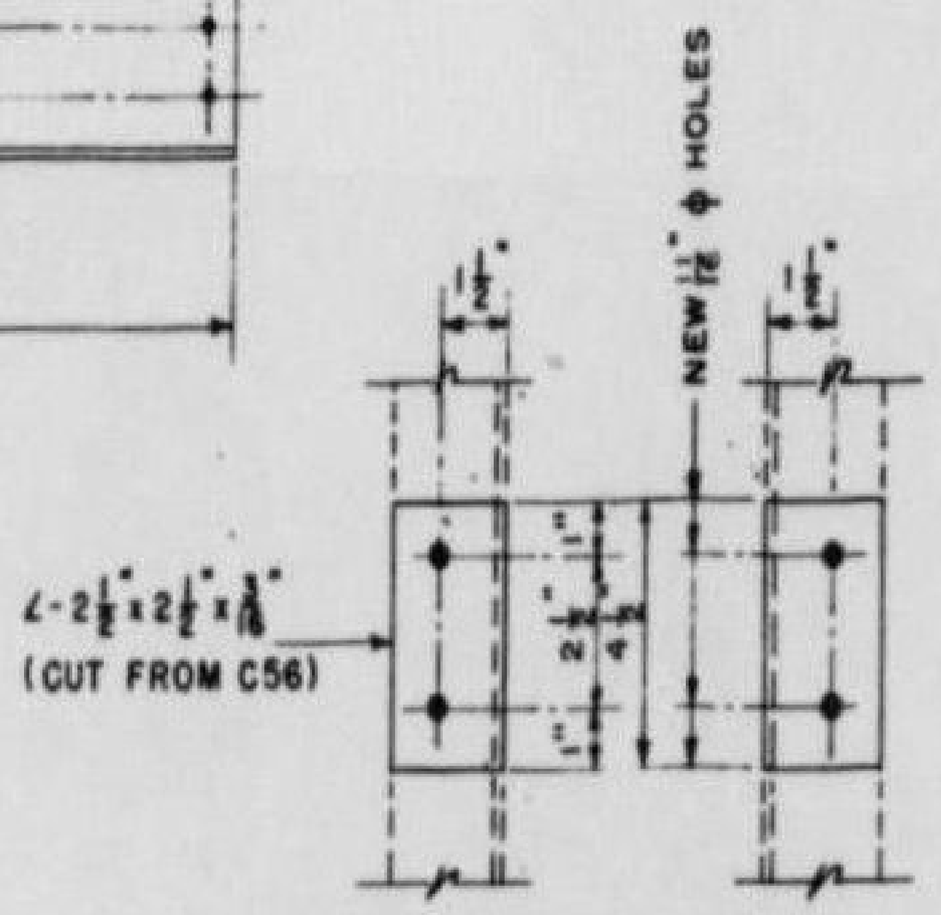
2-NEW HAND GRIP MK. N-5



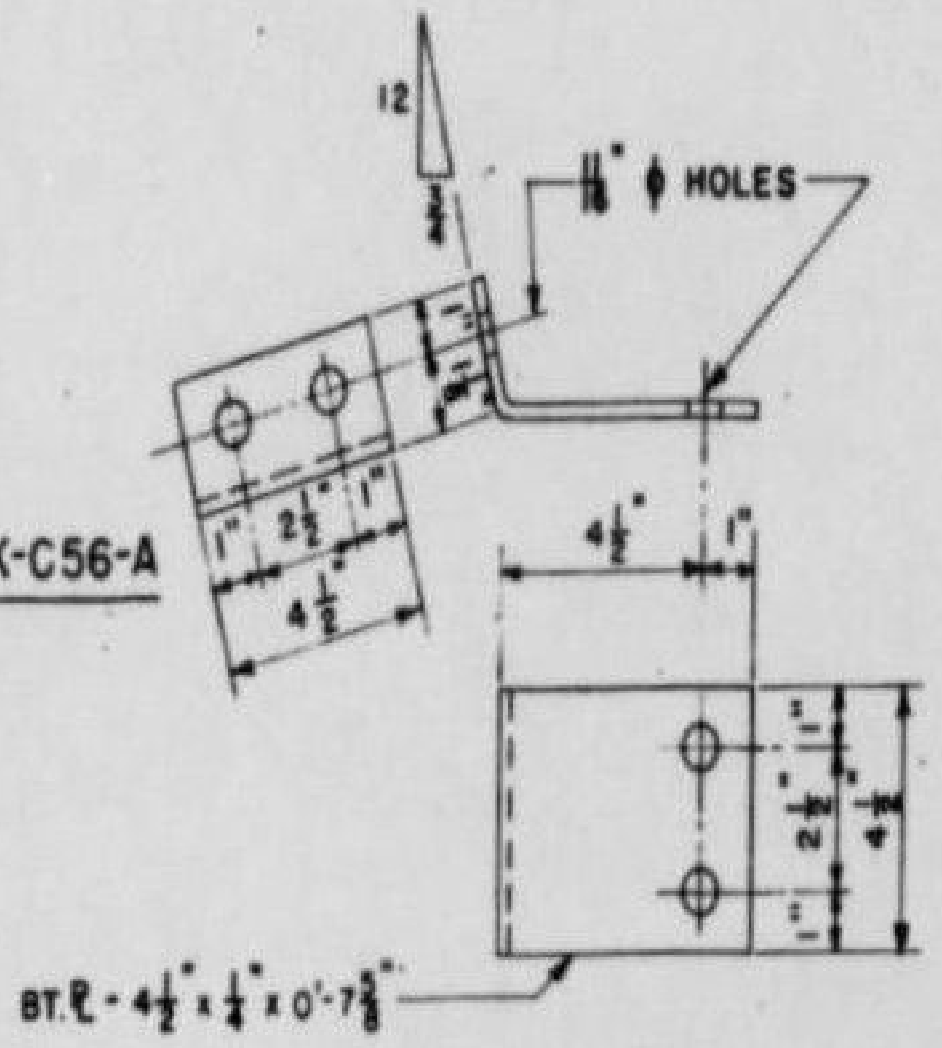
4-NEW BENT PLATES - MK-N3



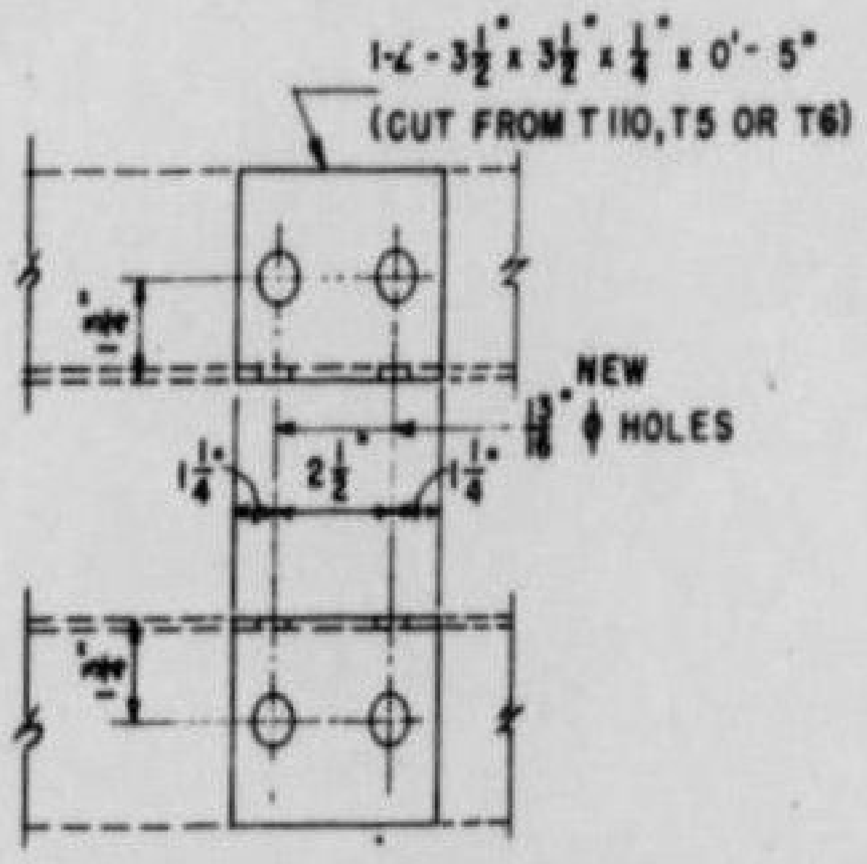
4-NEW ANGLES - MK-N2



4-ANGLE-MK-C56 - MODIFIED-MK-C56-A

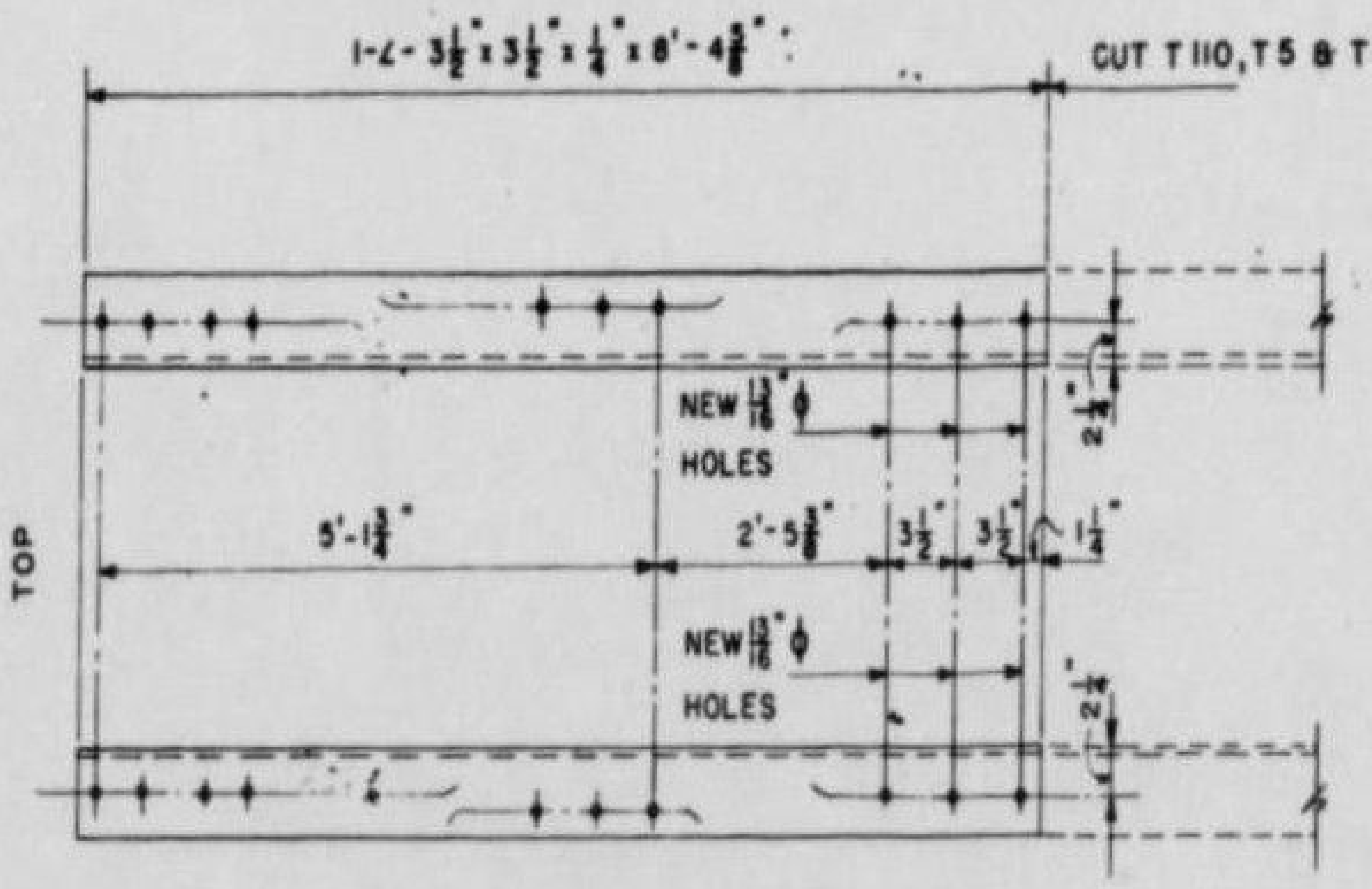


4-NEW BENT PLATES MK-N4



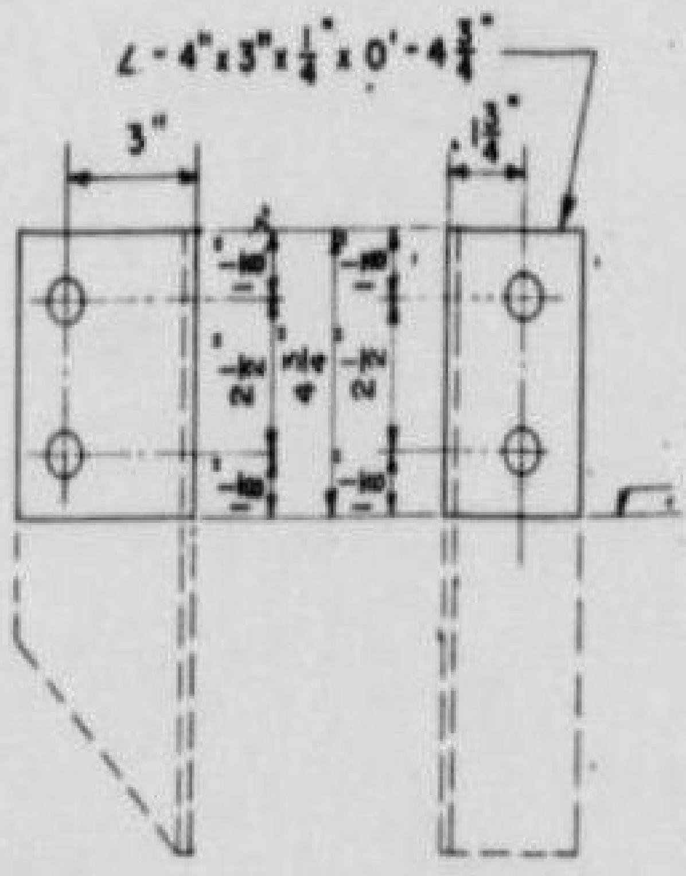
4-ANGLES-T110-MODIFIED-MK-T110-B
OR
1-ANGLE - MK-T5 - MODIFIED-MK-T5-B

3-ANGLES - MK-T6-MODIFIED-MK-T6-B



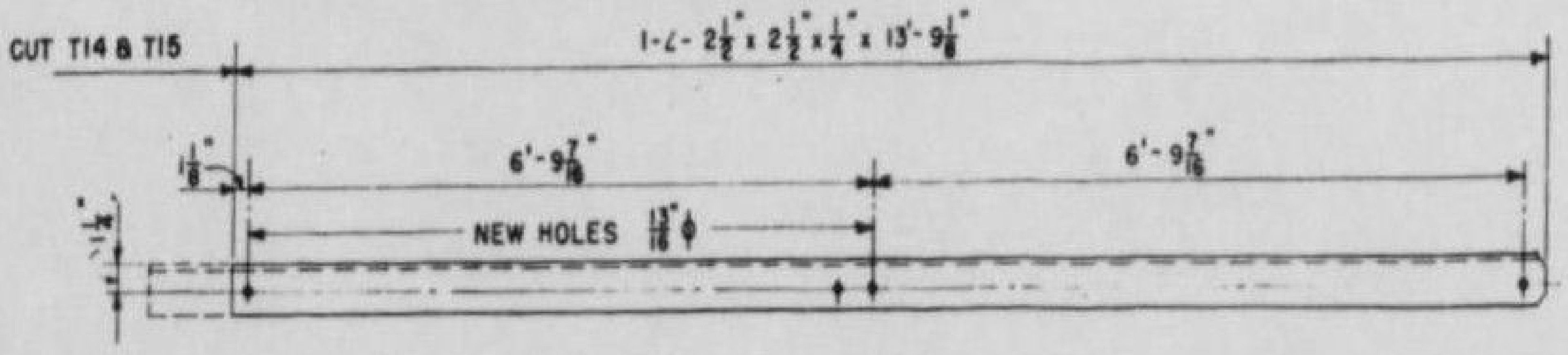
4-POST ANGLES - MK-T110 - MODIFIED - MK-T110-A
OR
1-POST ANGLE - MK-T5 - MODIFIED - MK-T5-A

3-POST ANGLES - MK-T6 - MODIFIED - MK-T6-A



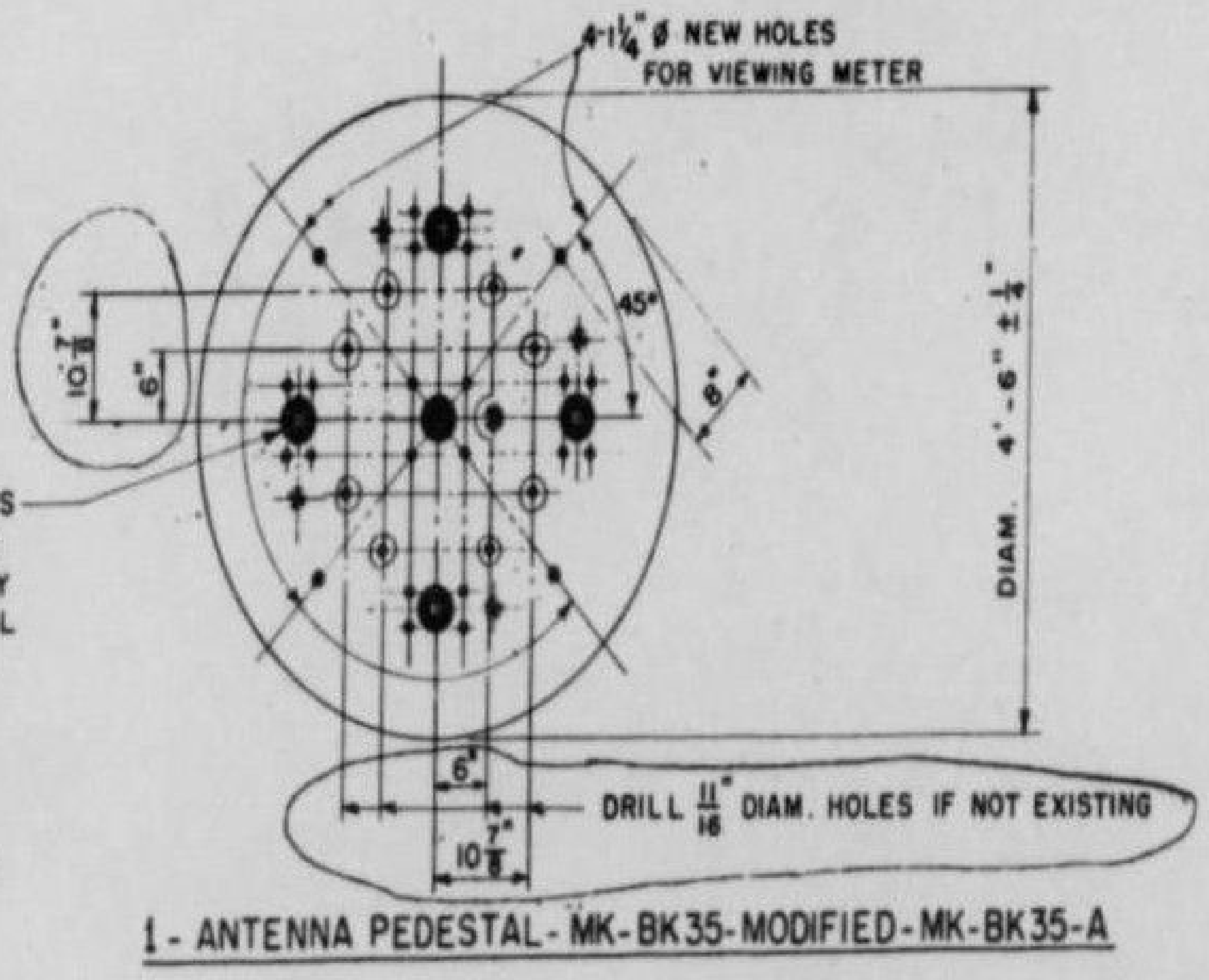
2-ANGLES-MK-T25-MODIFIED - MK-T25-A

2-ANGLES-MK-T26-MODIFIED - MK-T26-A



2-ANGLES - MK-T14 - MODIFIED - MK-T14-A

2-ANGLES - MK-T15 - MODIFIED - MK-T15-A



ENLARGE 5-1½" DIAM. HOLES TO APPROX. 3½" DIAM. — TO VENT SHELTER. (HOLES MAY BE FLAME CUT). REMOVE ALL BURRS AND SHARP EDGES.

DRILL 11/16" DIAM. HOLES IF NOT EXISTING

1 - ANTENNA PEDESTAL - MK-BK35 - MODIFIED - MK-BK35-A

NOTE:
ALL NEW STEEL PARTS ON THIS DWG TO BE GALVANIZED.

NO.	REVISION	DATE	CHECKED
3	DIMENSIONED 11/16 DIAM. HOLES IN BK35-A	10-24-50	
2	CHANGED NOTE ON BK 35 - A	9-28-50	
1	MINOR REVISIONS	7-20-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
TERNE PLATE COUNTERPOISE
MODIFICATION OF STEEL MEMBERS
(CIRCULAR FRAMING)

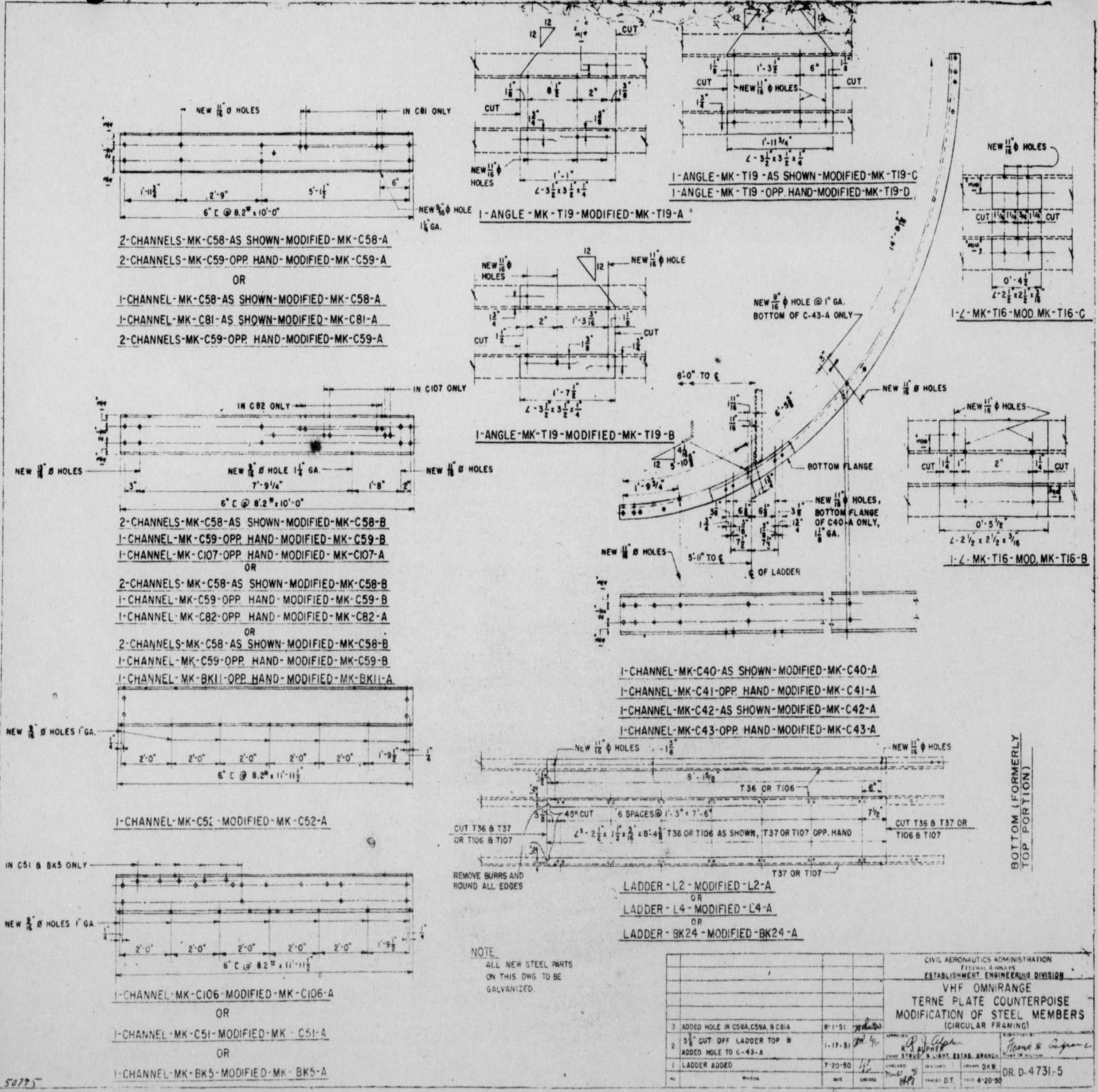
APPROVED: R.J. Alpher
R.J. ALPHER
CHIEF STRUC. & LGHT. ESTAB. BRANCH

SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION

CHECKED:
DESIGNED:
DRAWN: D.K.
TRACED: F.S.K.
DATE: 4-20-50

DR. D-4731-6

23233


NEW 11/16" Ø HOLES
IN C81 ONLY
6" [@ 8.2# x 10'-0"
NEW 9/16" Ø HOLE 1 1/4 GA.
2-CHANNELS-MK-C58-AS SHOWN-MODIFIED-MK-C58-A
2-CHANNELS-MK-C59-OPP. HAND-MODIFIED-MK-C59-A
OR
1-CHANNEL-MK-C58-AS SHOWN-MODIFIED-MK-C58-A
1-CHANNEL-MK-C81-AS SHOWN-MODIFIED-MK-C81-A
2-CHANNELS-MK-C59-OPP. HAND-MODIFIED-MK-C59-A
CUT
NEW 11/16" Ø HOLES
∠-3 1/2" x 3 1/2" x 1/4"
1-ANGLE-MK-T19-MODIFIED-MK-T19-A
NEW 11/16" Ø HOLES
1-ANGLE-MK-T19-AS SHOWN-MODIFIED-MK-T19-C
1-ANGLE-MK-T19-OPP. HAND-MODIFIED-MK-T19-D
NEW 11/16" Ø HOLES
∠-2 1/2" x 2 1/2" x 3/16"
1-∠-MK-T16-MOD. MK-T16-C
NEW 11/16" Ø HOLE
1-ANGLE-MK-T19-MODIFIED-MK-T19-B
IN C107 ONLY
IN C82 ONLY
NEW 11/16" Ø HOLES
NEW 9/16" Ø HOLE 1 1/4" GA.
NEW 11/16" Ø HOLES
7'-9 1/4"
6" [@ 8.2# x 10'-0"
2-CHANNELS-MK-C58-AS SHOWN-MODIFIED-MK-C58-B
1-CHANNEL-MK-C59-OPP. HAND-MODIFIED-MK-C59-B
1-CHANNEL-MK-C107-OPP. HAND-MODIFIED-MK-C107-A
OR
2-CHANNELS-MK-C58-AS SHOWN-MODIFIED-MK-C58-B
1-CHANNEL-MK-C59-OPP. HAND-MODIFIED-MK-C59-B
1-CHANNEL-MK-C82-OPP. HAND-MODIFIED-MK-C82-A
OR
2-CHANNELS-MK-C58-AS SHOWN-MODIFIED-MK-C58-B
1-CHANNEL-MK-C59-OPP. HAND-MODIFIED-MK-C59-B
1-CHANNEL-MK-BK11-OPP. HAND-MODIFIED-MK-BK11-A
NEW 9/16" Ø HOLE @ 1" GA.
BOTTOM OF C-43-A ONLY
6'-0" TO ℄
NEW 11/16" Ø HOLES
BOTTOM FLANGE
NEW 11/16" HOLES, BOTTOM FLANGE OF C40-A ONLY, 1 1/4" GA.
NEW 11/16" Ø HOLES
5'-11" TO ℄
℄ OF LADDER
NEW 11/16" Ø HOLES
∠-2 1/2 x 2 1/2 x 3/16
1-∠-MK-T16-MOD. MK-T16-B
1-CHANNEL-MK-C40-AS SHOWN-MODIFIED-MK-C40-A
1-CHANNEL-MK-C41-OPP. HAND-MODIFIED-MK-C41-A
1-CHANNEL-MK-C42-AS SHOWN-MODIFIED-MK-C42-A
1-CHANNEL-MK-C43-OPP. HAND-MODIFIED-MK-C43-A
NEW 9/16" Ø HOLES 1" GA.
6" [@ 8.2# x 11'-11 1/2"
1-CHANNEL-MK-C52-MODIFIED-MK-C52-A
NEW 11/16" Ø HOLES
NEW 11/16" Ø HOLES
T36 OR T106
45° CUT
6 SPACES @ 1'-3" = 7'-6"
∠S-2 1/2" x 1 1/2" x 3/16" x 8'-4 5/8" T36 OR T106 AS SHOWN, T37 OR T107 OPP. HAND
CUT T36 & T37 OR T106 & T107
CUT T36 & T37 OR T106 & T107
T37 OR T107
REMOVE BURRS AND ROUND ALL EDGES
LADDER-L2-MODIFIED-L2-A
OR
LADDER-L4-MODIFIED-L4-A
OR
LADDER-BK24-MODIFIED-BK24-A
BOTTOM (FORMERLY TOP PORTION)
IN C51 & BK5 ONLY
NEW 9/16" Ø HOLES 1" GA
6" [@ 8.2# x 11'-11 1/2"
1-CHANNEL-MK-C106-MODIFIED-MK-C106-A
OR
1-CHANNEL-MK-C51-MODIFIED-MK-C51-A
OR
1-CHANNEL-MK-BK5-MODIFIED-MK-BK5-A

NOTE
ALL NEW STEEL PARTS
ON THIS DWG TO BE
GALVANIZED.

3	ADDED HOLE IN C58A, C59A, & C81A	8-1-51	
2	5 5/8" CUT OFF LADDER TOP & ADDED HOLE TO C-43-A	1-17-51	
1	LADDER ADDED	7-20-50	
NO.	REVISION	DATE	CHECKED

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

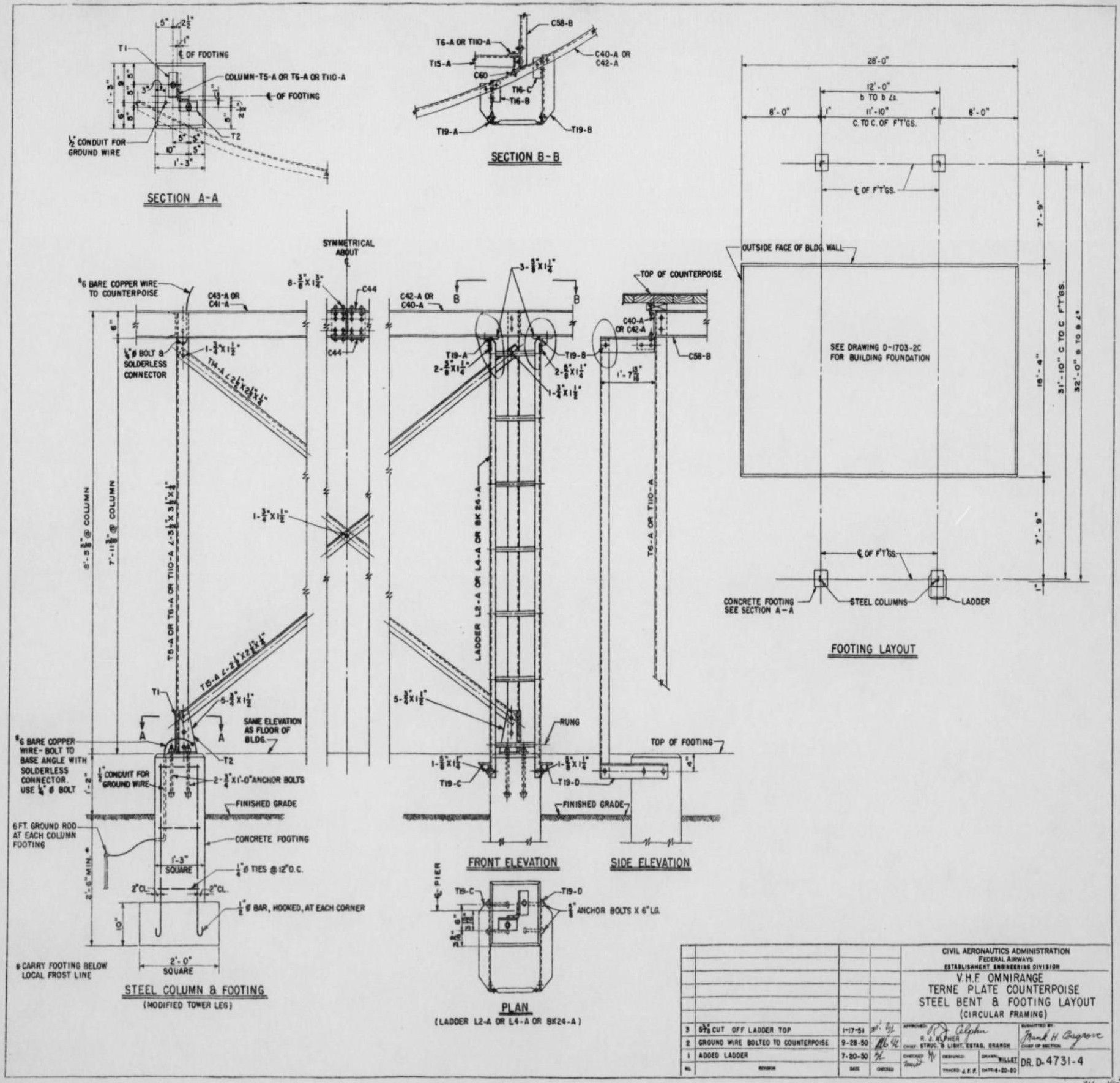
VHF OMNIRANGE
TERNE PLATE COUNTERPOISE
MODIFICATION OF STEEL MEMBERS
(CIRCULAR FRAMING)

APPROVED R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH

CHECKED
DESIGNED
DRAWN DKW
TRACED D.T.
DATE 4-20-50

DR. D-4731-5

50775



CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F. OMNIRANGE
TERNE PLATE COUNTERPOISE
STEEL BENT & FOOTING LAYOUT
(CIRCULAR FRAMING)

NO.	REVISION	DATE	CHECKED
3	5⅞" CUT OFF LADDER TOP	1-17-51	
2	GROUND WIRE BOLTED TO COUNTERPOISE	9-28-50	
1	ADDED LADDER	7-20-50	

APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF, STRUC. & LIGHT. ESTAB. BRANCH

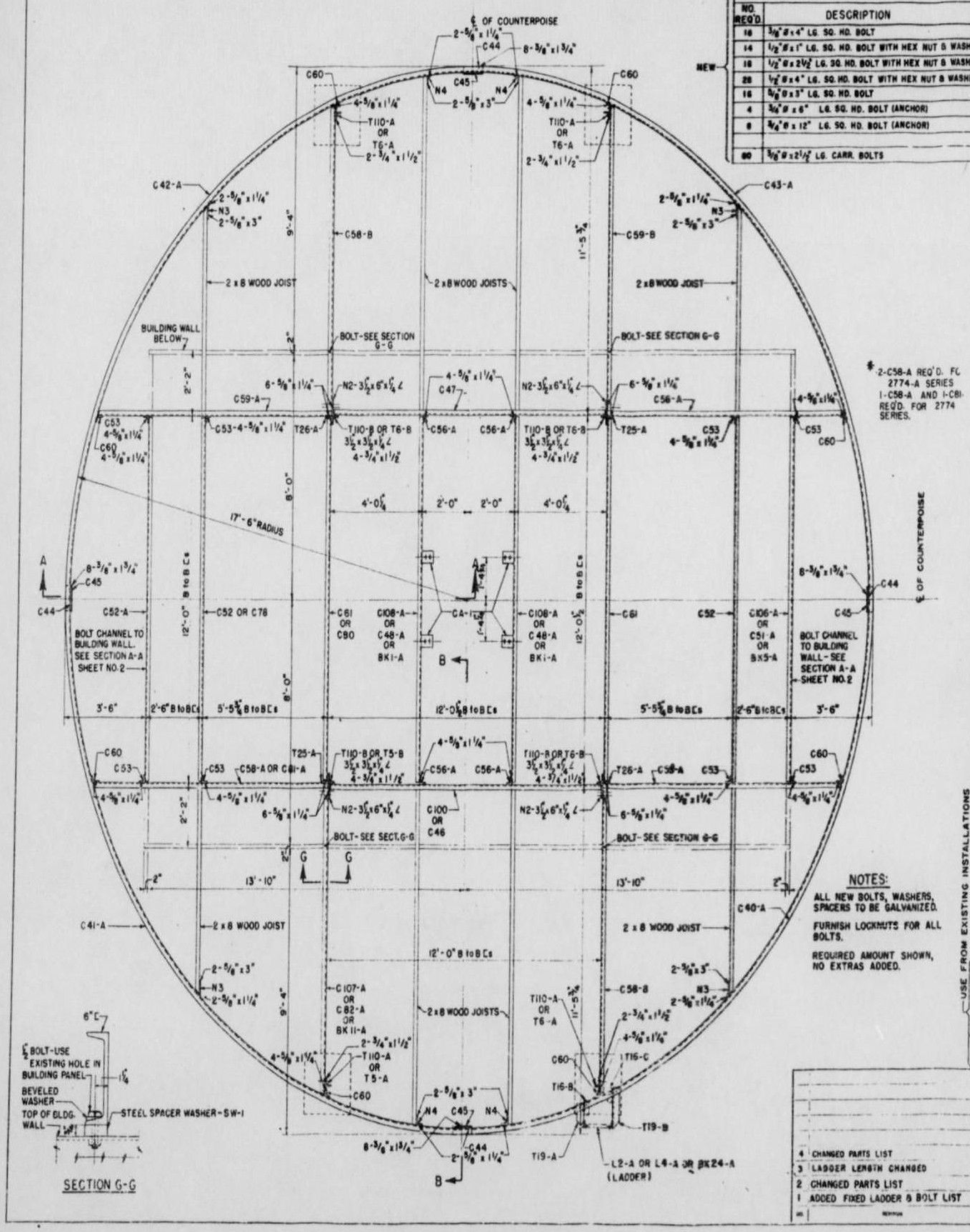
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION

CHECKED:
DESIGNED:
DRAWN: WILLET
TRACED: J.F.F.
DATE: 4-20-50

DR. D-4731-4

74

Counterpoise required



*2-C58-A REQ'D. FC 2774-A SERIES 1-C58-A AND 1-C81-REQ'D. FOR 2774 SERIES.

NOTES:

ALL NEW BOLTS, WASHERS, SPACERS TO BE GALVANIZED.

FURNISH LOCKNUTS FOR ALL BOLTS.

REQUIRED AMOUNT SHOWN, NO EXTRAS ADDED.

NEW

NO. REQ'D.	DESCRIPTION
16	3/8" Ø x 4" LG. SQ. HD. BOLT
14	1/2" Ø x 1" LG. SQ. HD. BOLT WITH HEX NUT & WASHER
16	1/2" Ø x 2 1/2" LG. SQ. HD. BOLT WITH HEX NUT & WASHER
28	1/2" Ø x 4" LG. SQ. HD. BOLT WITH HEX NUT & WASHER
16	5/8" Ø x 3" LG. SQ. HD. BOLT
4	3/4" Ø x 6" LG. SQ. HD. BOLT (ANCHOR)
8	3/4" Ø x 12" LG. SQ. HD. BOLT (ANCHOR)
80	3/8" Ø x 2 1/2" LG. CARR. BOLTS

PARTS LIST-ONE COUNTERPOISE

MARK	NO REQD	DESCRIPTION	LENGTH	REMARKS
CA 1	4	CASTER ASSEMBLY		EXISTING
C44	8	PL 1 3/4 x 5/16	0'-10"	EXISTING
C45	4	PL 5 1/2 x 5/16	0'-10"	EXISTING
C46 OR C47 OR C100	2	[s 6" @ 8.2#	11'-10 3/4	EXISTING
C61 OR C80	2	[s 6" @ 8.2#	11'-10 3/4	EXISTING
C60	8	BT. PLs 4 1/2 x 1/4	0'-5 3/4	EXISTING
C52 OR C78	2	[s 6" @ 8.2#	11'-11 1/2	EXISTING
C53	8	∠s 2 1/2 x 2 1/2 x 5/16	0'-4 1/2	EXISTING
T1	4	[s 10" @ 15.3#	0'-5 1/2	EXISTING
T2	4	[s 10" @ 15.3#	0'-5 1/2	EXISTING
T25-A	2	∠s 4" x 3" x 1/4	0'-4 3/4	T25 MODIFIED
T26-A	2	∠s 4" x 3" x 1/4	0'-4 3/4	T26 MODIFIED
C40-A	1	[6" @ 8.2#	27'-2 15/16	C40 MODIFIED
C41-A	1	[6" @ 8.2#	27'-2 15/16	C41 MODIFIED
C42-A	1	[6" @ 8.2#	27'-2 15/16	C42 MODIFIED
C43-A	1	[6" @ 8.2#	27'-2 15/16	C43 MODIFIED
C48-A OR C108-A OR BK1-A	2	[s 6" @ 8.2#	12'-0"	C48 C108 BK1 MODIFIED
C106-A OR C51-A OR BK5-A	1	[s 6" @ 8.2#	11'-11 1/2	C106 C51 BK5 MODIFIED
C52-A	1	[6" @ 8.2#	11'-11 1/2	C52 MODIFIED
C56-A	4	CLIP ∠s 2 1/2 x 2 1/2 x 5/16	0'-4 1/2	CUT FROM C56
C58-A OR C81-A	*	[s 6" @ 8.2#	10'-0"	C58 C81 MODIFIED
C58-B	2	[s 6" @ 8.2#	10'-0"	C58 MODIFIED
C59-A	2	[s 6" @ 8.2#	10'-0"	C59 MODIFIED
C59-B	1	[6" @ 8.2#	10'-0"	C59 MODIFIED
C107-A OR C62-A OR BK11-A	1	[6" @ 8.2#	10'-0"	C107 C62 BK11 MODIFIED
T5-A OR T6-A OR T110-A	4	∠s 3 1/2 x 3 1/2 x 1/4	8'-4 5/8	T5 T6 T110 MODIFIED
T5-B OR T6-B OR T110-B	4	∠s 3 1/2 x 3 1/2 x 1/4	0'-8"	CUT FROM T5 CUT FROM T6 CUT FROM T110
T14-A	2	∠s 2 1/2 x 2 1/2 x 1/4	13'-9 7/16	T14 MODIFIED
T15-A	2	∠s 2 1/2 x 2 1/2 x 1/4	13'-9 7/16	T15 MODIFIED
BK35-A	1	CIRCULAR PLATE		BK35 MODIFIED
N2	4	∠s 3 1/2 x 6 x 1/4	0'-4 3/4	NEW
N3	4	BT. PLs 4 1/2 x 1/4	0'-7 5/8	NEW
N4	4	BT. PLs 4 1/2 x 1/4	0'-7 5/8	NEW
SW-1	4	SPACER WASHERS	2" SQ. x 1/8 - 5/8 Ø HOLE	NEW
N-5	2	HANDGRIP (LADDER)	SEE DETAIL ON SHEET 6	
L2-A OR L4-A OR BK24-A	1	LADDER	8'-4 5/8"	CUT FROM L2 CUT FROM L4 CUT FROM BK24
T16-B	1	∠ 2 1/2" x 2 1/2" x 5/16"	0'-3 1/2"	CUT FROM T16
T16-C	1	∠ 2 1/2" x 2 1/2" x 5/16"	0'-4 1/2"	CUT FROM T16
T19-A	1	∠ 3 1/2" x 3 1/2" x 1/4"	1'-1"	CUT FROM T19
T19-B	1	∠ 3 1/2" x 3 1/2" x 1/4"	1'-7 1/2"	CUT FROM T19
T19-C	1	∠ 3 1/2" x 3 1/2" x 1/4"	1'-11 3/4"	CUT FROM T19
T19-D	1	∠ 3 1/2" x 3 1/2" x 1/4"	1'-1 3/4"	CUT FROM T19

USE FROM EXISTING INSTALLATIONS

No. REQ'D	DESCRIPTION	No. REQ.	DESCRIPTION
104 EACH	3/8" Ø HEX, NUT & WASHER	32	5/8" Ø x 1 3/4" LG. BOLT
180 EACH	5/8" Ø HEX, NUT & WASHER		
8	5/8" Ø x 1" LG. BOLT		
156	5/8" Ø x 1 1/4" LG. BOLT		
94	3/4" Ø x 1 1/2" LG. BOLT		
106 EACH	3/4" Ø HEX, NUT & WASHER		

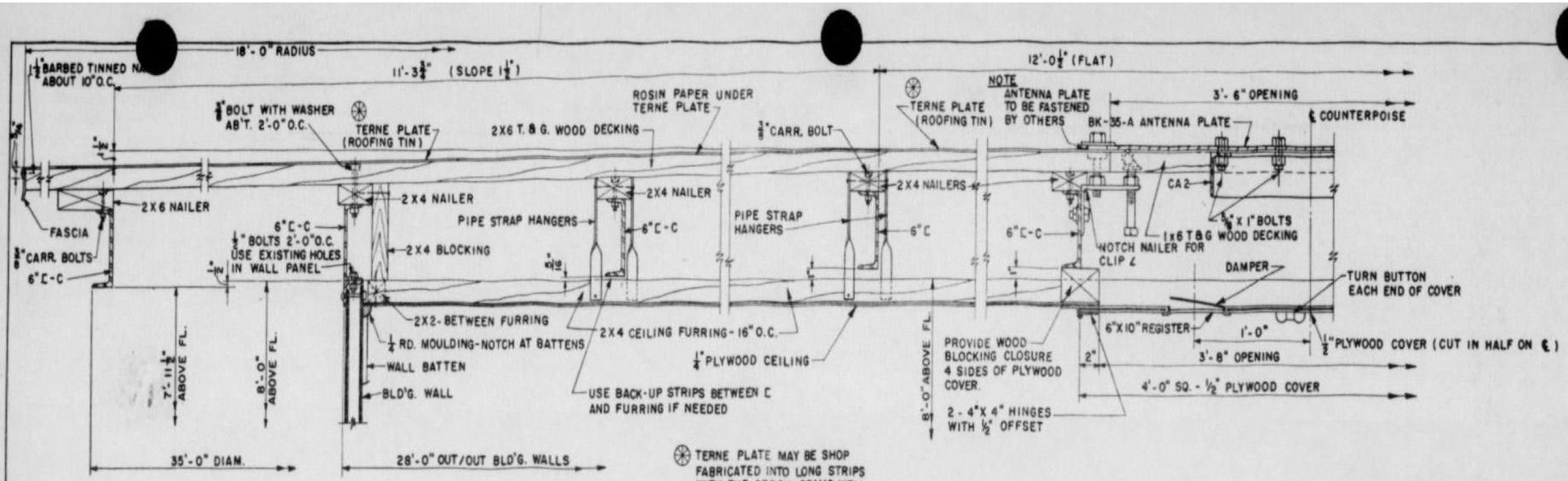
NO.	REVISION	DATE	CHECKED
4	CHANGED PARTS LIST	8-1-51	
3	LADDER LENGTH CHANGED	1-17-51	
2	CHANGED PARTS LIST	10-24-50	
1	ADDED FIXED LADDER & BOLT LIST	7-20-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
TERNE PLATE COUNTERPOISE
STEEL ERECTION
(CIRCULAR FRAMING)

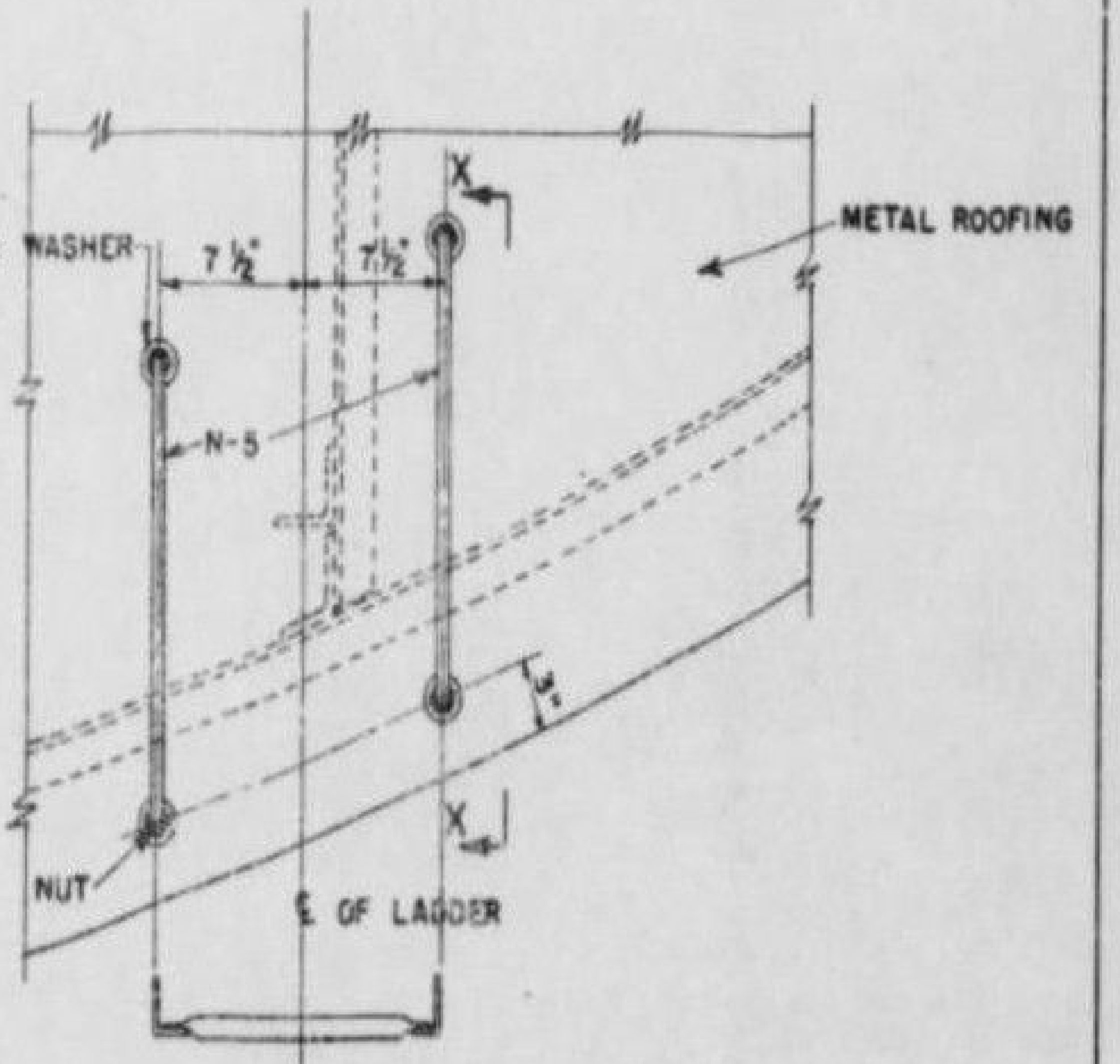
APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
CHECKED:
DESIGNED:
DRAWN: T.G.S.
TRACED: T.G.S.
DATE: 4-20-50
RECOMMENDED BY: Frank H. Cosgrove
CHIEF OF SECTION
DR. D-4731-3

Counterpoise reframed

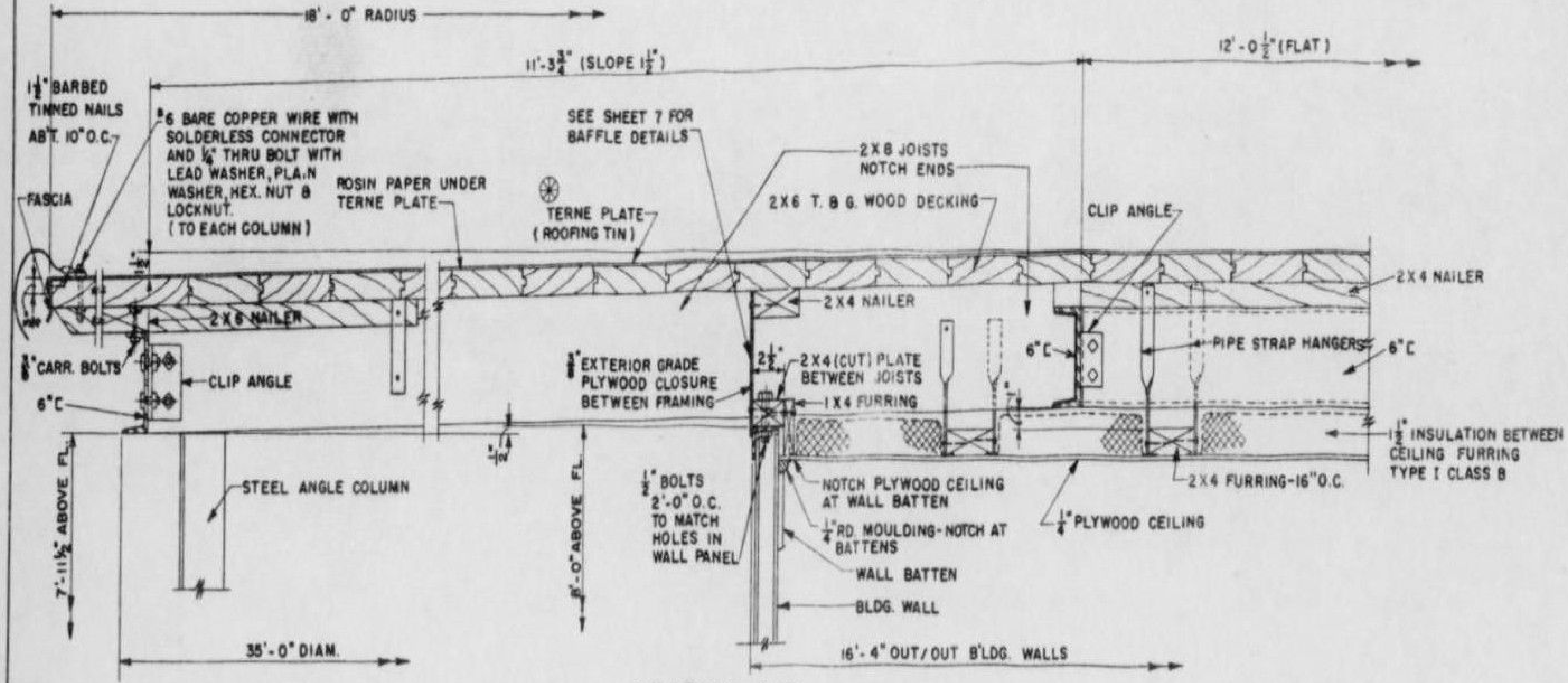

18'-0" RADIUS
1½" BARBED TINNED NAILS ABOUT 10" O.C.
11'-3¾" (SLOPE 1½")
12'-0½" (FLAT)
⅜" BOLT WITH WASHER AB'T. 2'-0" O.C.
TERNE PLATE (ROOFING TIN)
ROSIN PAPER UNDER TERNE PLATE
2X6 T. & G. WOOD DECKING
⅜" CARR. BOLT
NOTE ANTENNA PLATE TO BE FASTENED BY OTHERS
BK-35-A ANTENNA PLATE
3'-6" OPENING
℄ COUNTERPOISE
2X6 NAILER
FASCIA
⅜" CARR. BOLTS
6" C-C
2X4 NAILER
6" C-C
¼" BOLTS 2'-0" O.C. USE EXISTING HOLES IN WALL PANEL
2X4 BLOCKING
PIPE STRAP HANGERS
6" C-C
PIPE STRAP HANGERS
6" C
2X4 NAILERS
6" C-C
CA2
⅜" X 1" BOLTS
1X6 T&G WOOD DECKING
NOTCH NAILER FOR CLIP ∠
DAMPER
TURN BUTTON EACH END OF COVER
2X2 BETWEEN FURRING
¼ RD. MOULDING-NOTCH AT BATTENS
2X4 CEILING FURRING-16" O.C.
¼" PLYWOOD CEILING
WALL BATTEN
BLD'G. WALL
USE BACK-UP STRIPS BETWEEN C AND FURRING IF NEEDED
PROVIDE WOOD BLOCKING CLOSURE 4 SIDES OF PLYWOOD COVER.
2 - 4" X 4" HINGES WITH ½" OFFSET
6" X 10" REGISTER
1'-0"
½" PLYWOOD COVER (CUT IN HALF ON ℄)
2"
3'-8" OPENING
4'-0" SQ. - ½" PLYWOOD COVER
7'-11½" ABOVE FL.
8'-0" ABOVE FL.
8'-0" ABOVE FL.
35'-0" DIAM.
28'-0" OUT/OUT BLD'G. WALLS

✲ TERNE PLATE MAY BE SHOP FABRICATED INTO LONG STRIPS WITH THE CROSS SEAMS WELL SOAKED IN SOLDER IN LIEU OF LAYING INDIVIDUAL SHEETS IN THE FIELD AS INDICATED IN THE APPLICABLE SPEC, OR 20" WIDE ROLL MATERIAL MAY BE USED IN LIEU OF SHEETS.

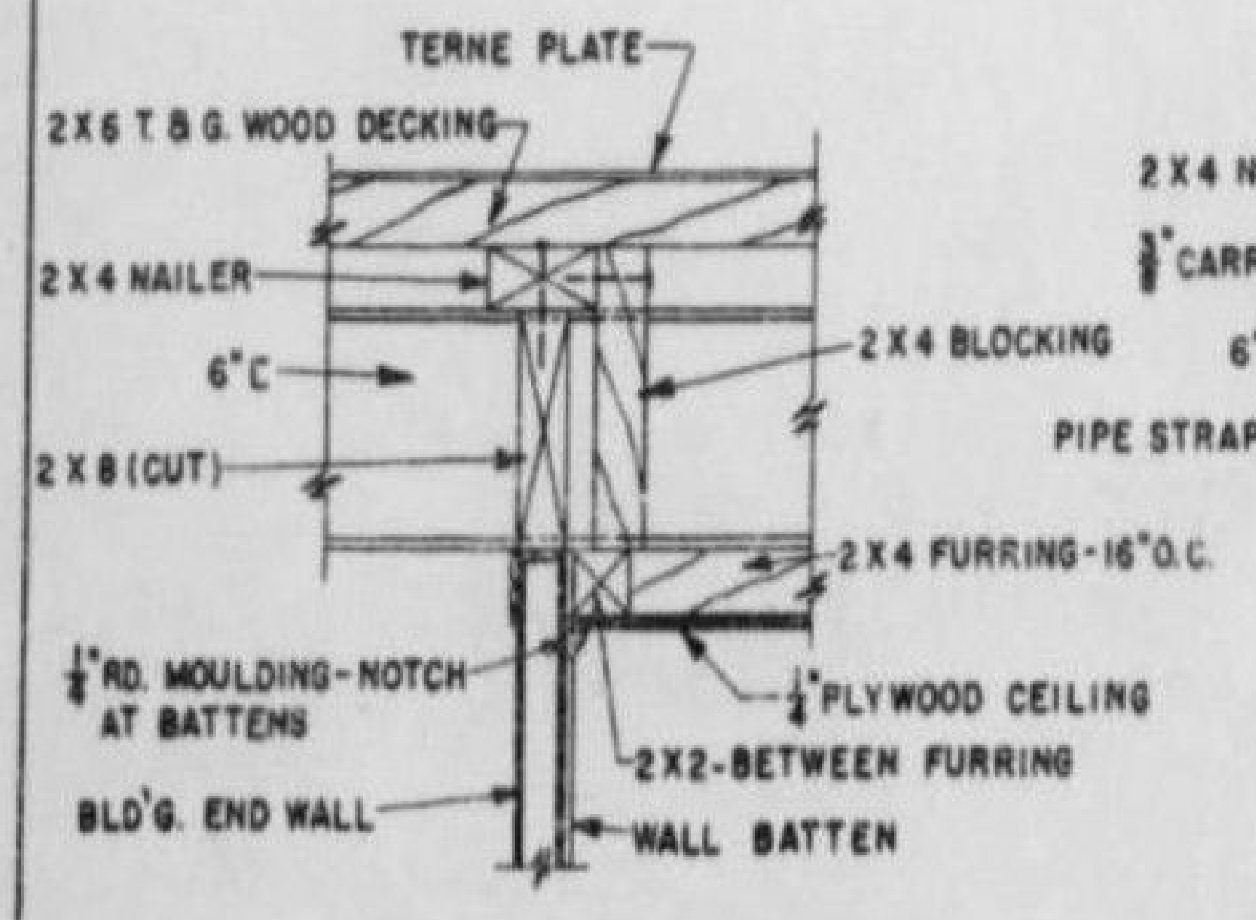
SECTION A-A



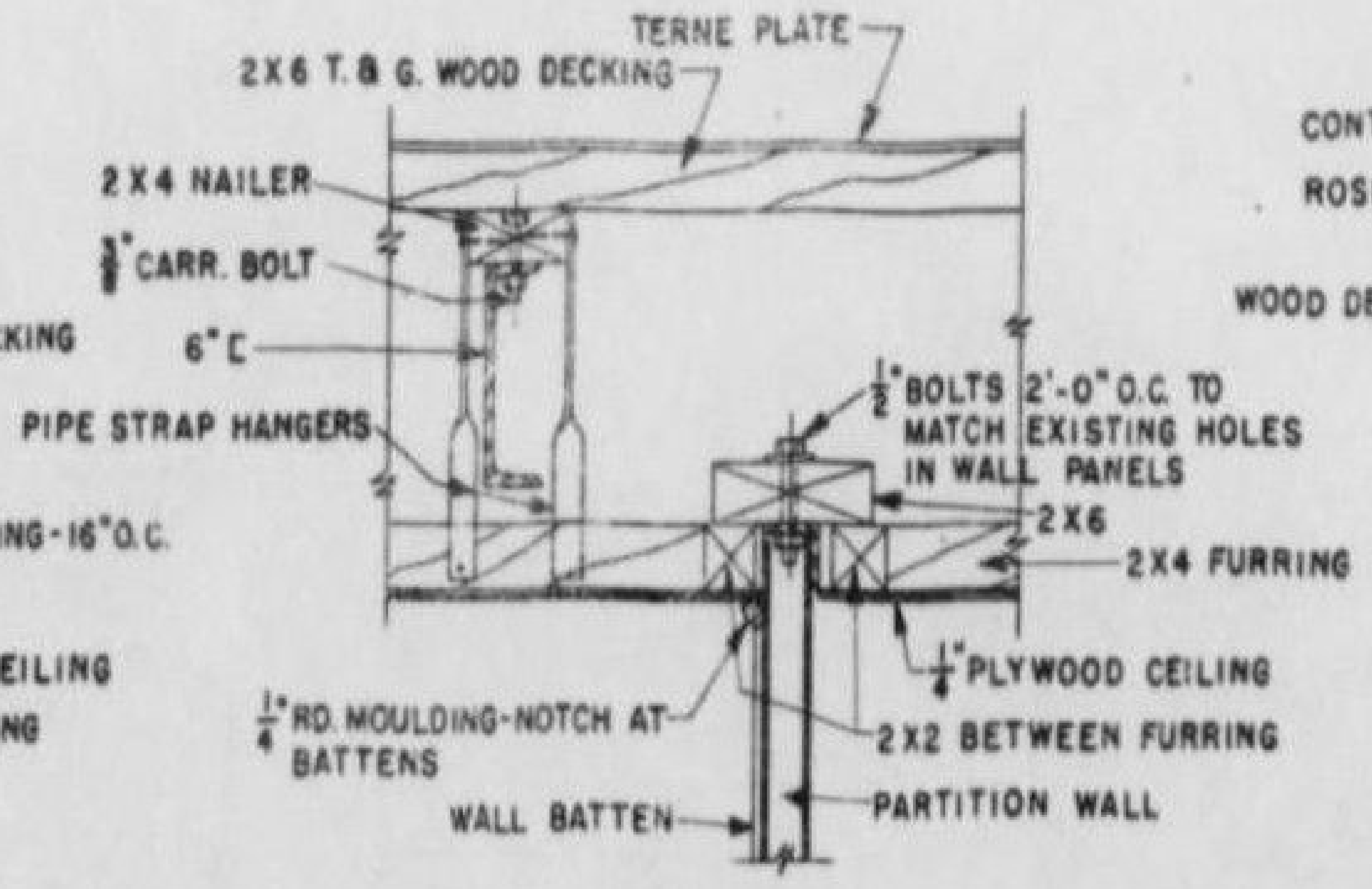
PLAN
LADDER HAND GRIP


18'-0" RADIUS
11'-3¾" (SLOPE 1½")
12'-0½" (FLAT)
1½" BARBED TINNED NAILS AB'T. 10" O.C.
#6 BARE COPPER WIRE WITH SOLDERLESS CONNECTOR AND ¼" THRU BOLT WITH LEAD WASHER, PLAIN WASHER, HEX. NUT & LOCKNUT. (TO EACH COLUMN)
SEE SHEET 7 FOR BAFFLE DETAILS
2X8 JOISTS NOTCH ENDS
FASCIA
ROSIN PAPER UNDER TERNE PLATE
TERNE PLATE (ROOFING TIN)
2X6 T. & G. WOOD DECKING
CLIP ANGLE
2X4 NAILER
2X6 NAILER
2X4 NAILER
⅜" CARR. BOLTS
CLIP ANGLE
6" C
⅜" EXTERIOR GRADE PLYWOOD CLOSURE BETWEEN FRAMING
2X4 (CUT) PLATE BETWEEN JOISTS
1X4 FURRING
6" C
PIPE STRAP HANGERS
6" C
1½" INSULATION BETWEEN CEILING FURRING TYPE I CLASS B
STEEL ANGLE COLUMN
½" BOLTS 2'-0" O.C. TO MATCH HOLES IN WALL PANEL
NOTCH PLYWOOD CEILING AT WALL BATTEN
¼" RD. MOULDING-NOTCH AT BATTENS
WALL BATTEN
BLDG. WALL
2X4 FURRING-16" O.C.
¼" PLYWOOD CEILING
7'-11½" ABOVE FL.
8'-0" ABOVE FL.
35'-0" DIAM.
16'-4" OUT/OUT B'LDG. WALLS

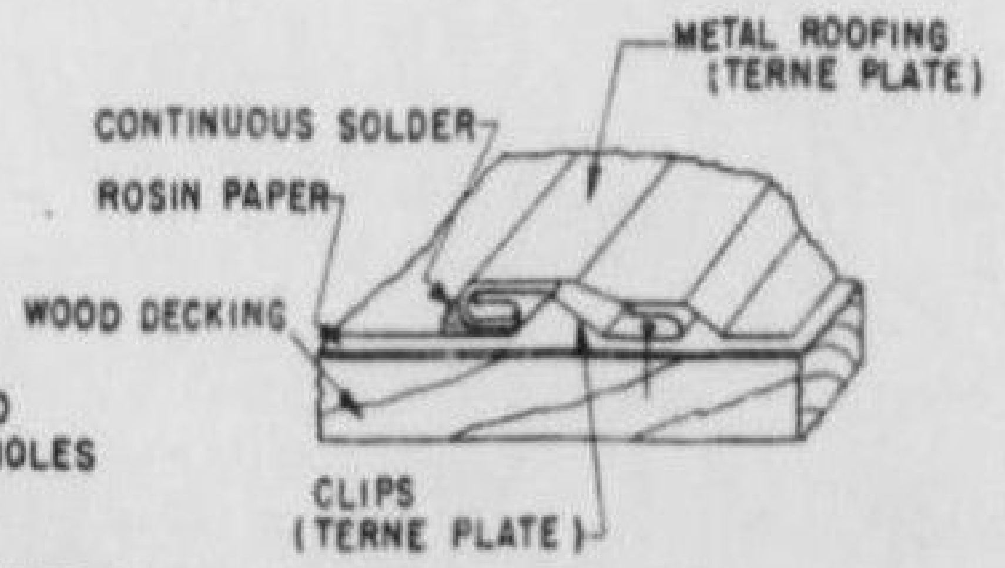
SECTION B-B



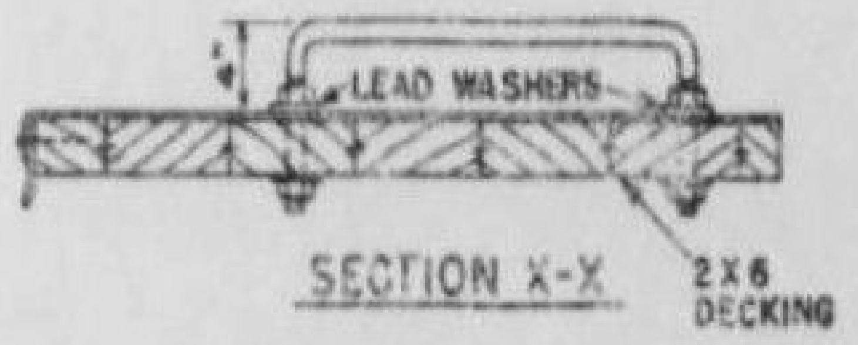
SECTION C-C



SECTION D-D



DETAIL-FLAT LOCK SEAM



SECTION X-X

FOR PLAN SEE SHEET 1

NO.	REVISION	DATE	CHECKED
4	ANTENNA PLATE SHOWN SOLID	4-16-52	
3	VENTS AND SECTIONS - SEE SHEET 7	1-17-51	
2	HAND GRIP-TERNE PLATE-ANTENNA OP'G.	9-28-50	
1	REV. LADDER	7-20-50	

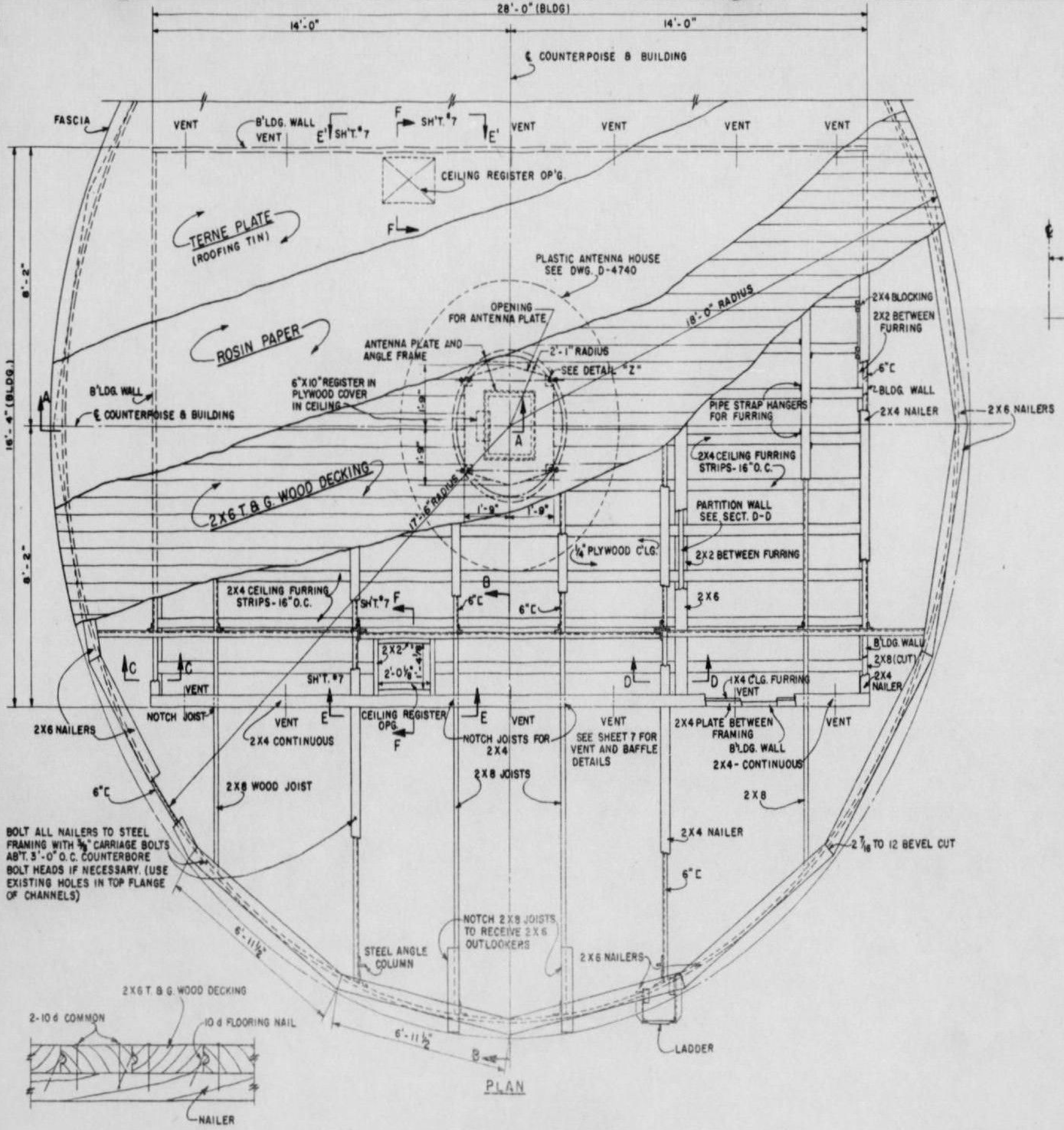
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F OMNIRANGE
TERNE PLATE COUNTERPOISE
SECTIONS
(CIRCULAR FRAMING)

APPROVED: R. D. Alpher
R. D. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY:
CHIEF OF SECTION
CHECKED
DESIGNED
DRAWN D. G. C.
TRACED H. R.
DATE 4-20-50
DR. D-4731-2

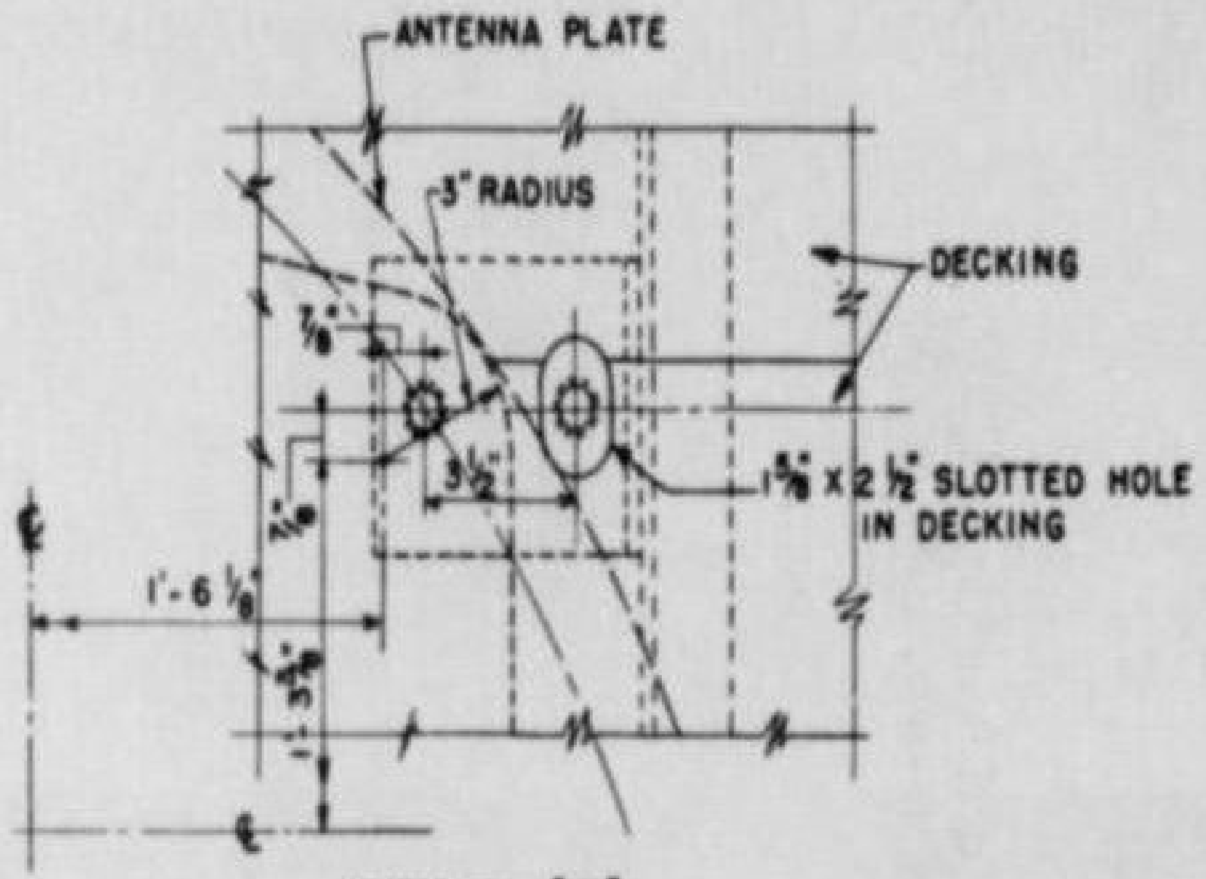
53117

Counterpoise required



PLAN

TYPICAL DECK NAILING



DETAIL "Z"

NOTES

1. TOWER AND ANTENNA SHELTER:
   - A. DISMANTLE EXISTING TOWER AND ANTENNA SHELTER. DISPOSE OF AS DIRECTED EXCEPT FOR PARTS TO BE USED AS SHOWN ON THE DRAWINGS.
   - B. EXISTING TOWER FOOTINGS TO BE LEVELED TO THE GROUND.
   - C. STEEL PARTS USED IN NEW STRUCTURE TO BE TOUCHED UP WITH ALUMINUM PAINT WHERE GALVANIZING HAS BEEN REMOVED. FED. SPEC. TT-A-468.
2. BUILDING:
   - A. REMOVE ROOF FROM EXISTING BUILDING, INCLUDING TRUSSES, KNEE BRACES, GABLE PANELS AND CEILING CONDUITS.
   - B. REPLACE CEILING CONDUITS, MODIFY AS REQUIRED.
   - C. MODIFY VENTILATION AS REQUIRED.

REFERENCE DRAWINGS
(NEW AND MODIFIED STRUCTURES)

1. BUILDING:	
A. PLAN & ELEVATION	D-1701-2AC
B. ERECTION	D-1702-48
C. ELECTRICAL LAYOUT	D-1702-48A
D. FOUNDATION	D-1703-2C
2. TERNE PLATE COUNTERPOISE (CIRCULAR FRAMING)	
A. PLAN	D-4731-1
B. SECTIONS	D-4731-2
C. STEEL ERECTION	D-4731-3
D. STEEL BENT & FOOTING LAYOUT	D-4731-4
E. MODIFICATION OF STEEL MEMBERS	D-4731-5
F. MODIFICATION OF STEEL MEMBERS	D-4731-6
G. VENTILATION DETAILS	D-4731-7
3. PLASTIC ANTENNA SHELTER	D-4740

REFERENCE DRAWINGS
(EXISTING STRUCTURES)

1. BUILDING:	
A. PLAN & ELEVATION	C-1701-2B
B. ERECTION	D-1702-2B
C. ELECTRICAL	D-1702-2A
D. FOUNDATION	D-1703-2C
2. TOWER	
A. ERECTION & FABRICATION	D-2774 SERIES D-2774-A SERIES } EXCLUDING DRAWINGS SUFFIXED "B", "D" AND "E"
3. ANTENNA SHELTER (WOOD)	D-4379

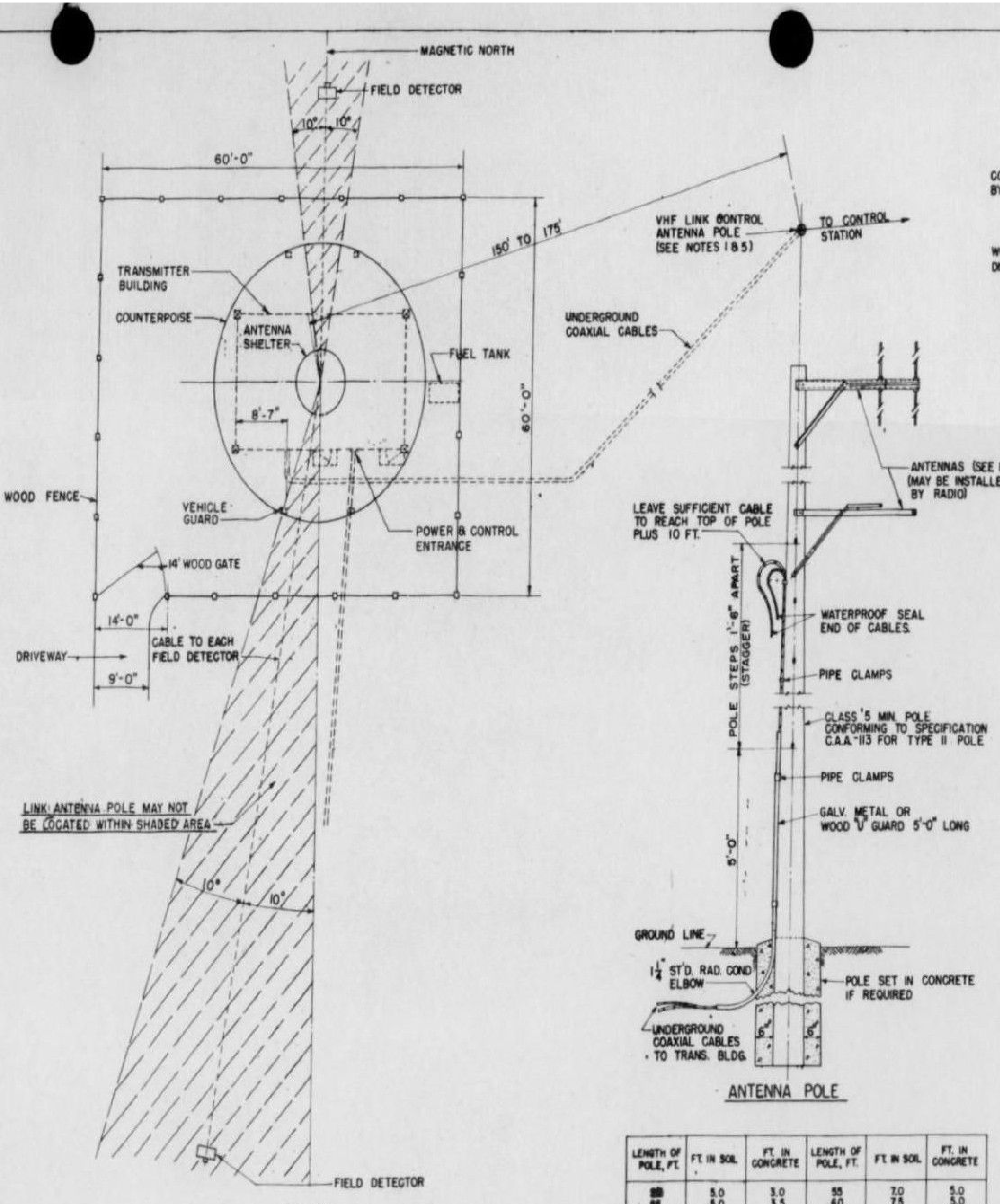
NO.	REVISION	DATE	CHECKED
4	REMOVED "BY OTHERS".	4-16-52	HRL
3	VENT HOLES BETWEEN JOISTS	1-17-51	HRL
2	ANTENNA PLATE OPENING REVISED	9-28-50	HRL
1	REV. LADDER, DELETED SPECS.	7-20-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F OMNIRANGE
TERNE PLATE COUNTERPOISE
PLAN
(CIRCULAR FRAMING)

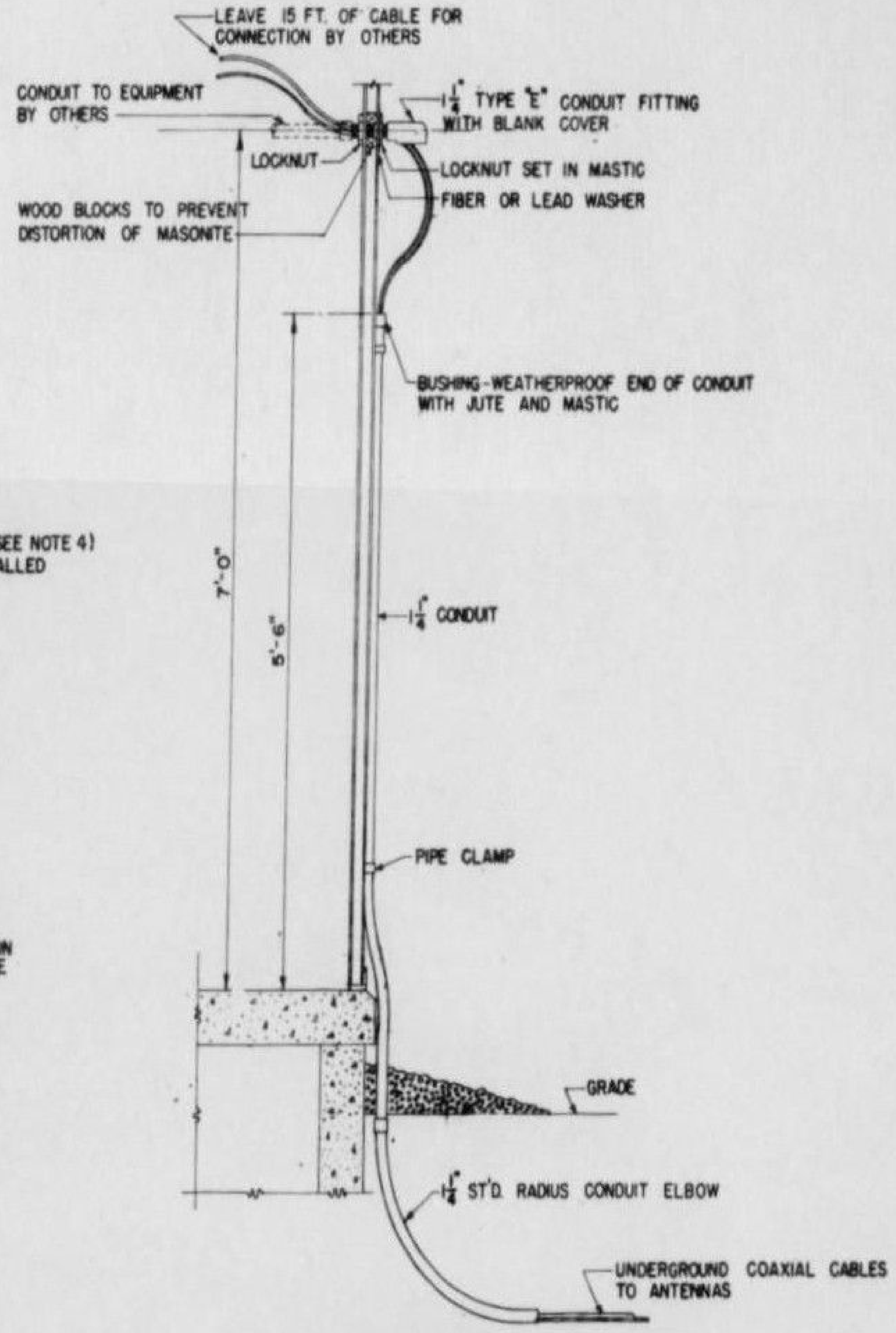
APPROVED: R. J. Alpher
CHIEF, STRUCT. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: James Ceruzzo
CHIEF OF SECTION
CHECKED
DESIGNED HRL
DRAWN D.G.C.
TRACED J.F.F.
DATE 4-20-50
DR. D-4731-1

53119


MAGNETIC NORTH
FIELD DETECTOR
10°
10°
60'-0"
150' TO 175'
VHF LINK CONTROL ANTENNA POLE (SEE NOTES 1 & 5)
TO CONTROL STATION
TRANSMITTER BUILDING
COUNTERPOISE
ANTENNA SHELTER
FUEL TANK
UNDERGROUND COAXIAL CABLES
60'-0"
8'-7"
WOOD FENCE
VEHICLE GUARD
POWER & CONTROL ENTRANCE
14' WOOD GATE
14'-0"
DRIVEWAY
9'-0"
CABLE TO EACH FIELD DETECTOR
LINK ANTENNA POLE MAY NOT BE LOCATED WITHIN SHADED AREA
10°
10°
FIELD DETECTOR
ANTENNAS (SEE NOTE 4) (MAY BE INSTALLED BY RADIO)
LEAVE SUFFICIENT CABLE TO REACH TOP OF POLE PLUS 10 FT.
POLE STEPS 1'-6" APART (STAGGER)
WATERPROOF SEAL END OF CABLES.
PIPE CLAMPS
CLASS 5 MIN. POLE CONFORMING TO SPECIFICATION C.A.A.-113 FOR TYPE II POLE
PIPE CLAMPS
GALV. METAL OR WOOD "U" GUARD 5'-0" LONG
5'-0"
GROUND LINE
1¼" ST'D. RAD. COND ELBOW
POLE SET IN CONCRETE IF REQUIRED
UNDERGROUND COAXIAL CABLES TO TRANS. BLDG.
6"
6"

PLAN

ANTENNA POLE


LEAVE 15 FT. OF CABLE FOR CONNECTION BY OTHERS
CONDUIT TO EQUIPMENT BY OTHERS
1¼" TYPE "E" CONDUIT FITTING WITH BLANK COVER
LOCKNUT
LOCKNUT SET IN MASTIC
FIBER OR LEAD WASHER
WOOD BLOCKS TO PREVENT DISTORTION OF MASONITE
BUSHING-WEATHERPROOF END OF CONDUIT WITH JUTE AND MASTIC
7'-0"
5'-6"
1¼" CONDUIT
PIPE CLAMP
GRADE
1¼" ST'D. RADIUS CONDUIT ELBOW
UNDERGROUND COAXIAL CABLES TO ANTENNAS

CABLE ENTRANCE DETAIL
(TO BE USED ONLY WHEN NO EXISTING CONDUITS ARE AVAILABLE)

LENGTH OF POLE, FT.	FT. IN SOIL	FT. IN CONCRETE	LENGTH OF POLE, FT.	FT. IN SOIL	FT. IN CONCRETE
20	5.0	3.0	55	7.0	5.0
25	5.0	3.5	60	7.5	5.0
30	5.5	3.5	65	8.0	6.0
35	6.0	4.0	70	8.0	6.0
40	6.0	4.0	75	8.5	6.0
45	6.5	4.5	80	9.0	6.5
50	7.0	4.5			

AVERAGE DEPTH OF POLE SETTING

NOTES:

1. ANTENNA POLE WILL BE OF A HEIGHT SUFFICIENT TO PROVIDE PRACTICALLY UNOBSTRUCTED LINE OF SIGHT BETWEEN RANGE AND CONTROL STATION ANTENNAS.
2. CABLES WILL ENTER BUILDING THRU 1¼" OR LARGER CONDUITS INTO FRONT OF TRANSMITTER ROOM. EXISTING CONDUITS THRU FOUNDATION WALL AND FLOOR WILL BE USED WHERE AVAILABLE. IF NONE AVAILABLE, PROVIDE CONDUIT AS DETAILED HEREON.
3. UNDERGROUND COAXIAL CABLES WILL BE BURIED 36" DEEP UNDER DRIVE AND OUTSIDE FENCED AREA. CABLES WITHIN FENCED AREA MAY BE 18" DEEP.
4. DIPOLE ARRAY ANTENNAS TO BE MOUNTED ON POLE AS INDICATED OR ON CROSSARM. POLARIZATION AND SEPARATION TO BE AS SPECIFIED FOR INDIVIDUAL PROJECT.
5. ANTENNA POLE WILL BE LOCATED TO BEST SUIT LOCAL CONDITIONS AND DIRECTION TO CONTROL STATION, EXCEPT THAT IT MAY NOT BE WITHIN A 10° ANGLE, MEASURED FROM THE TOWER CENTER, OF EITHER SIDE OF A DETECTOR POLE.

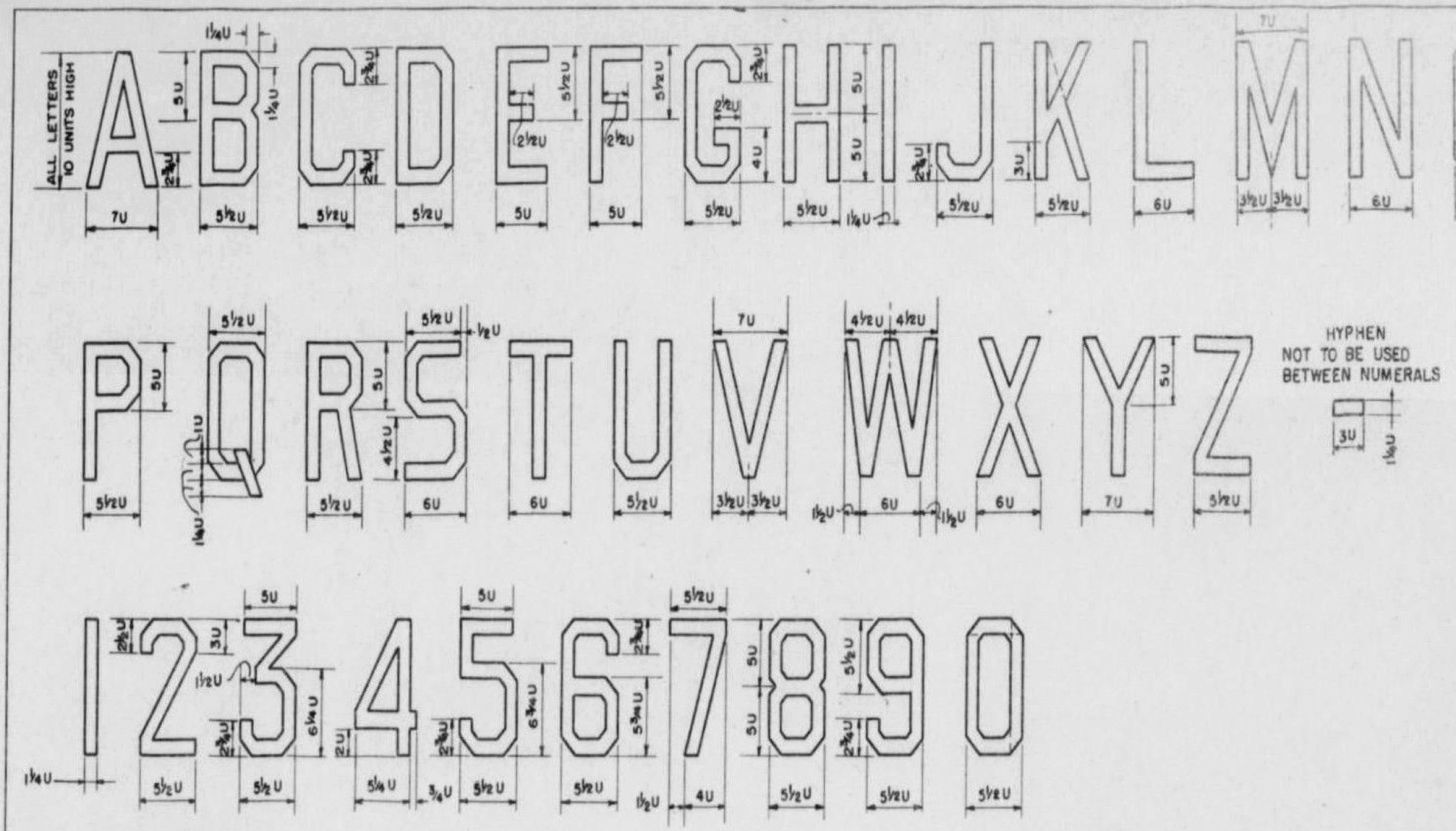
NO.	REVISION	DATE	CHECKED
3	CHANGED FENCE AND GATE DIMENSIONS	5-10-51	
2	PLOT LAYOUT REVISED	8-1-50	
1	DELETED FORMER NOTE 4	4-6-50	

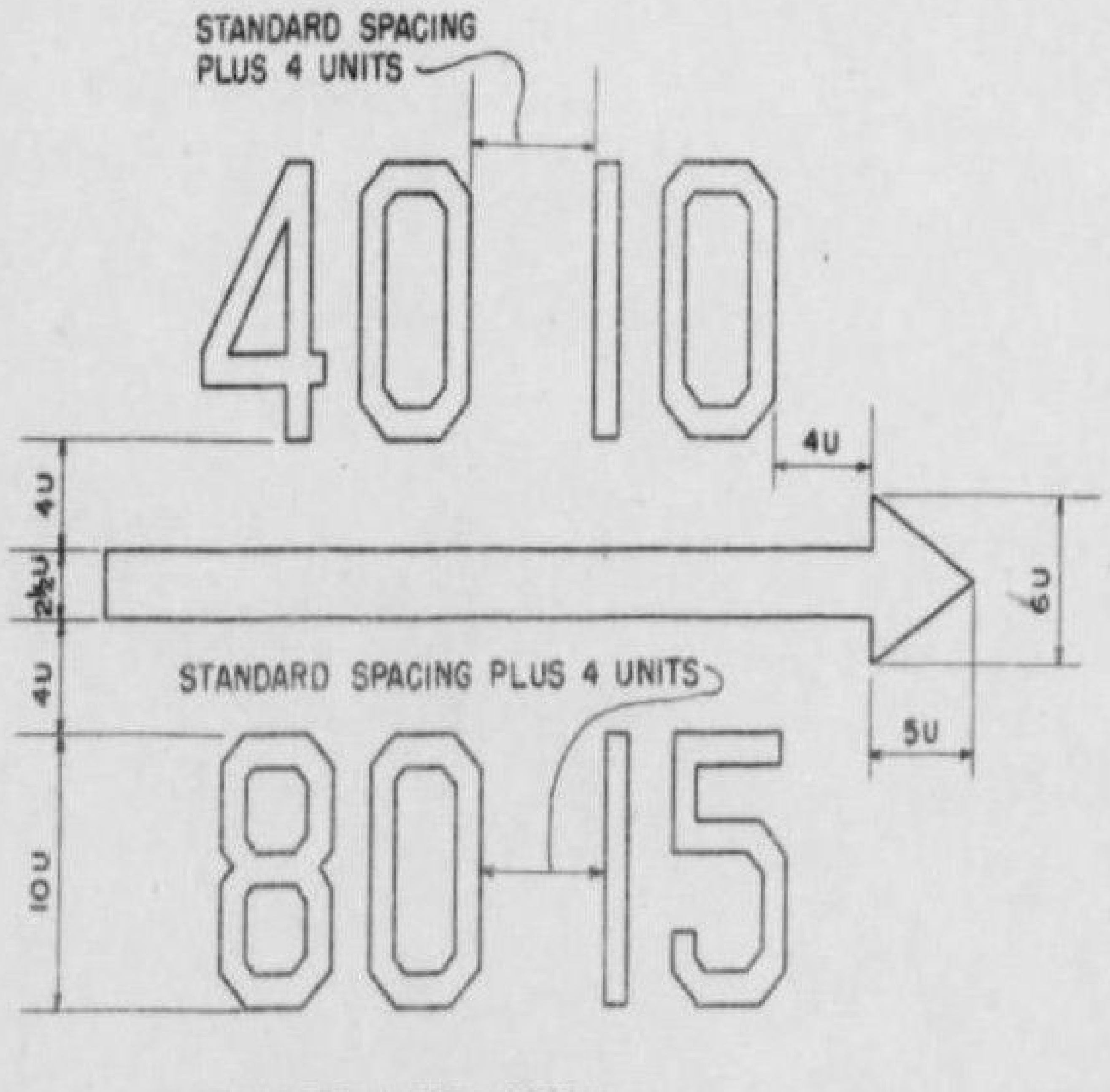
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F RANGE FACILITY
V.H.F LINK ANTENNA
INSTALLATION ON POLE

APPROVED for Frank H. Cosgrove
H.O. STRAWN
CHIEF: STRUC. & LIGHT ESTAB. BRANCH
SUBMITTED BY R. J. Alpher
CHIEF OF SECTION
CHECKED
DESIGNED TSH
DRAWN TGS
TRACED DT
DATE 5-13-49
DR. D-4682

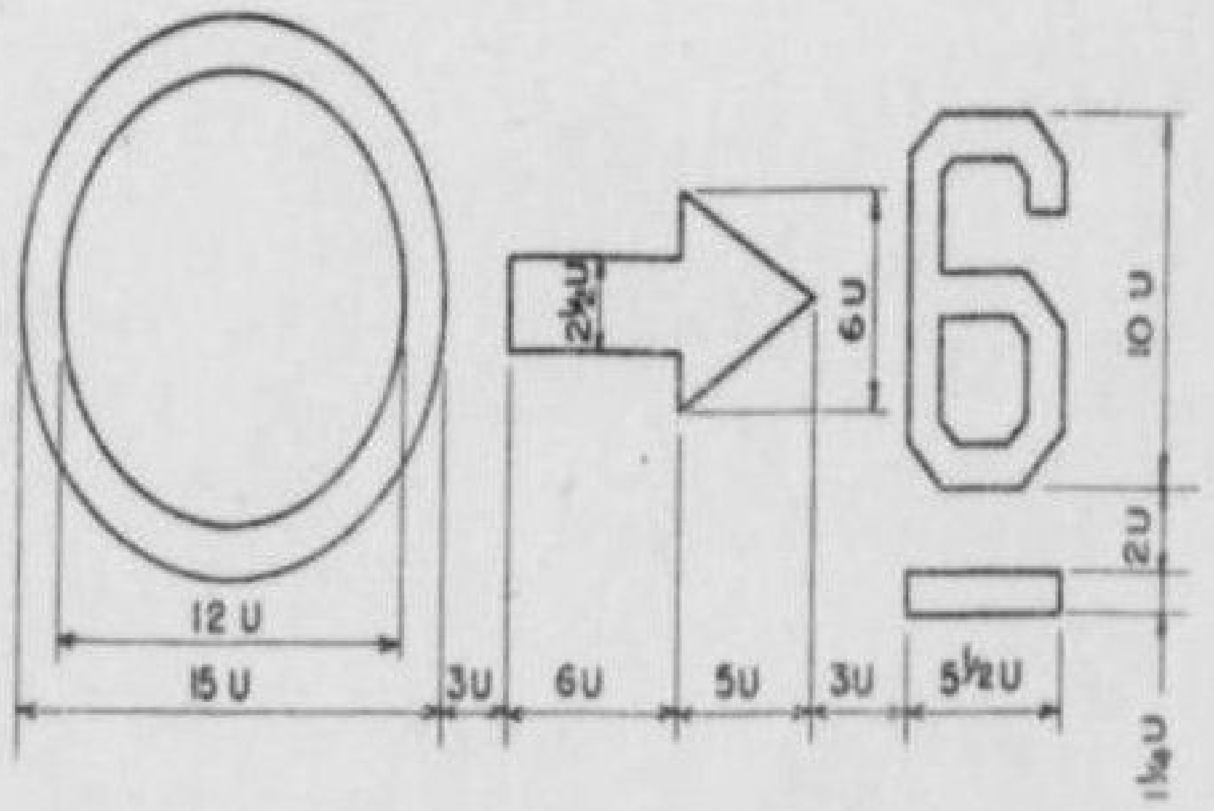
24455


ALL LETTERS 10 UNITS HIGH
HYPHEN NOT TO BE USED BETWEEN NUMERALS



STANDARD NORTH ARROW

(LATITUDE ALWAYS TO WEST)



BAR TO BE USED UNDER ALL MILEAGE NUMERALS

STANDARD DIRECTIONAL ARROW TO LANDING AREA

(NOT HARD SURFACED)

NOTES:

1. WIDTH OF ALL STROKES - 1¼ UNITS UNLESS OTHERWISE SHOWN.
2. DIMENSIONS ARE GIVEN IN UNITS.
3. SEE DWGS. A-4324-26 AND A-4324-27 FOR SPACING OF LETTERS AND NUMBERS.
4. 45° DEGREE BEVEL CORNERS AS SHOWN.

NO.	REVISION	DATE	CHECKED	DATE	CHECKED

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

ALPHABET, NUMERALS AND SYMBOLS
FOR
FACILITY BUILDING AIR MARKING

APPROVED: H.W. HOWARD
HWH
CHIEF: AIRWAYS ENGINEERING DIVISION

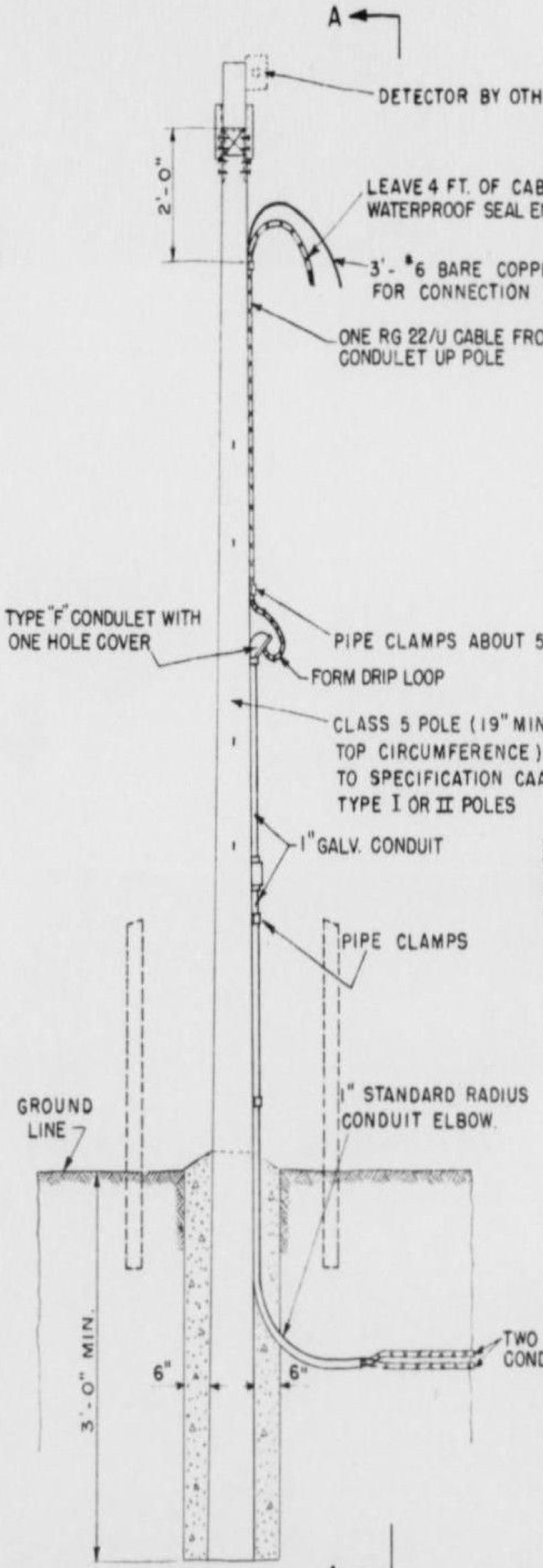
SUBMITTED BY:
CHIEF OF SECTION

CHECKED
DESIGNED:
DRAWN: D.L.D.
TRACED: D.L.D.
DATE: 7-31-46

DR. C-4508

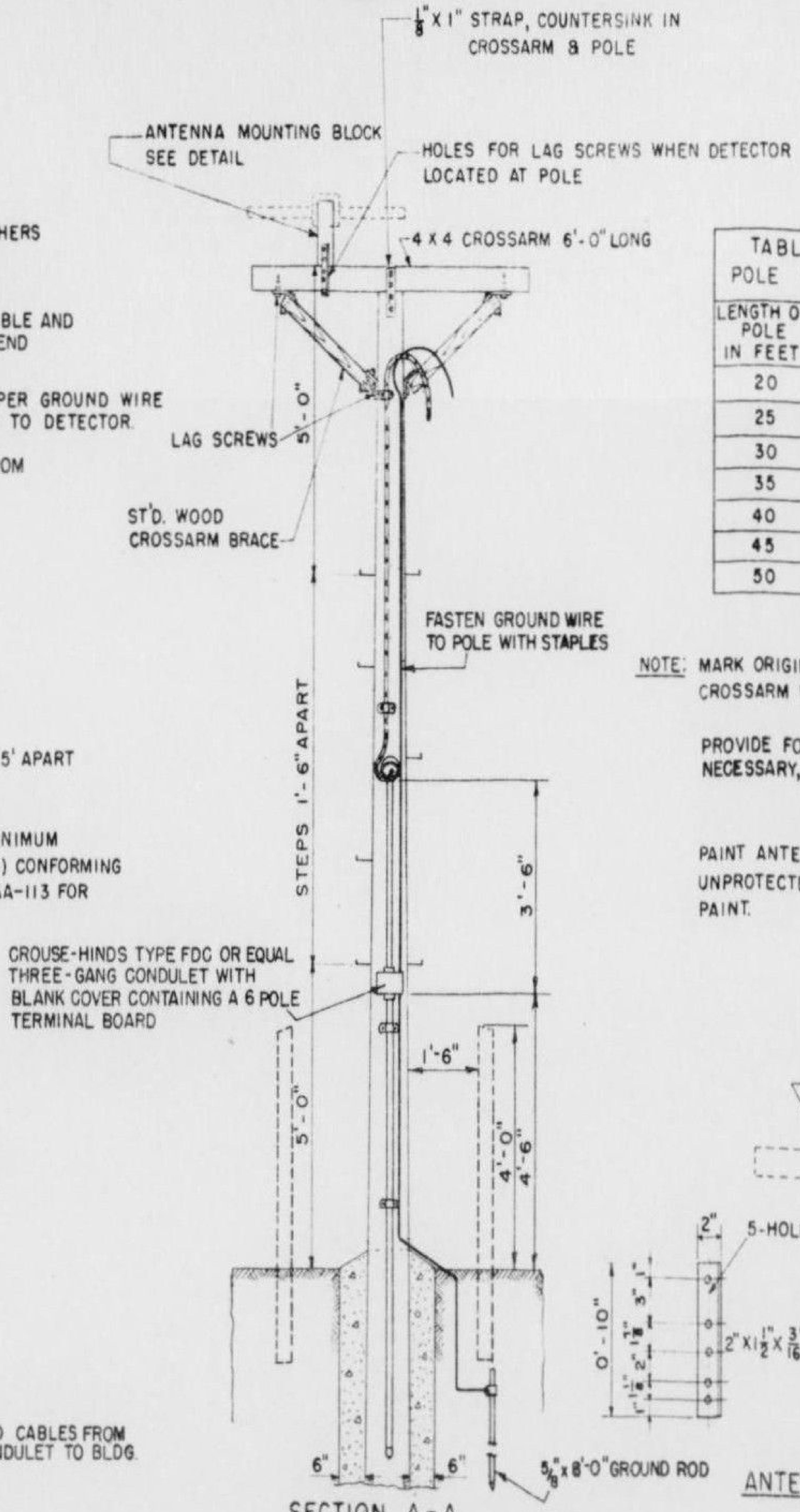
SUPERSEDES DWGS. SK NO 16, 16A, 16B

22457


A
A
DETECTOR BY OTHERS
2'-0"
LEAVE 4 FT. OF CABLE AND WATERPROOF SEAL END
3'- #6 BARE COPPER GROUND WIRE FOR CONNECTION TO DETECTOR.
ONE RG 22/U CABLE FROM CONDULET UP POLE
TYPE "F" CONDULET WITH ONE HOLE COVER
PIPE CLAMPS ABOUT 5' APART
FORM DRIP LOOP
CLASS 5 POLE (19" MINIMUM TOP CIRCUMFERENCE) CONFORMING TO SPECIFICATION CAA-113 FOR TYPE I OR II POLES
1" GALV. CONDUIT
PIPE CLAMPS
GROUND LINE
1" STANDARD RADIUS CONDUIT ELBOW.
3'-0" MIN.
6"
6"
TWO CABLES FROM CONDULET TO BLDG.

SIDE ELEVATION

FIG. 1


1/8" X 1" STRAP, COUNTERSINK IN CROSSARM & POLE
ANTENNA MOUNTING BLOCK SEE DETAIL
HOLES FOR LAG SCREWS WHEN DETECTOR LOCATED AT POLE
4 X 4 CROSSARM 6'-0" LONG
LAG SCREWS
5'-0"
ST'D. WOOD CROSSARM BRACE
FASTEN GROUND WIRE TO POLE WITH STAPLES
STEPS 1'-6" APART
3'-6"
CROUSE-HINDS TYPE FDC OR EQUAL THREE-GANG CONDULET WITH BLANK COVER CONTAINING A 6 POLE TERMINAL BOARD
1'-6"
5'-0"
4'-0"
4'-6"
6"
6"
5/8" x 8'-0" GROUND ROD

SECTION A-A

FIG. 2

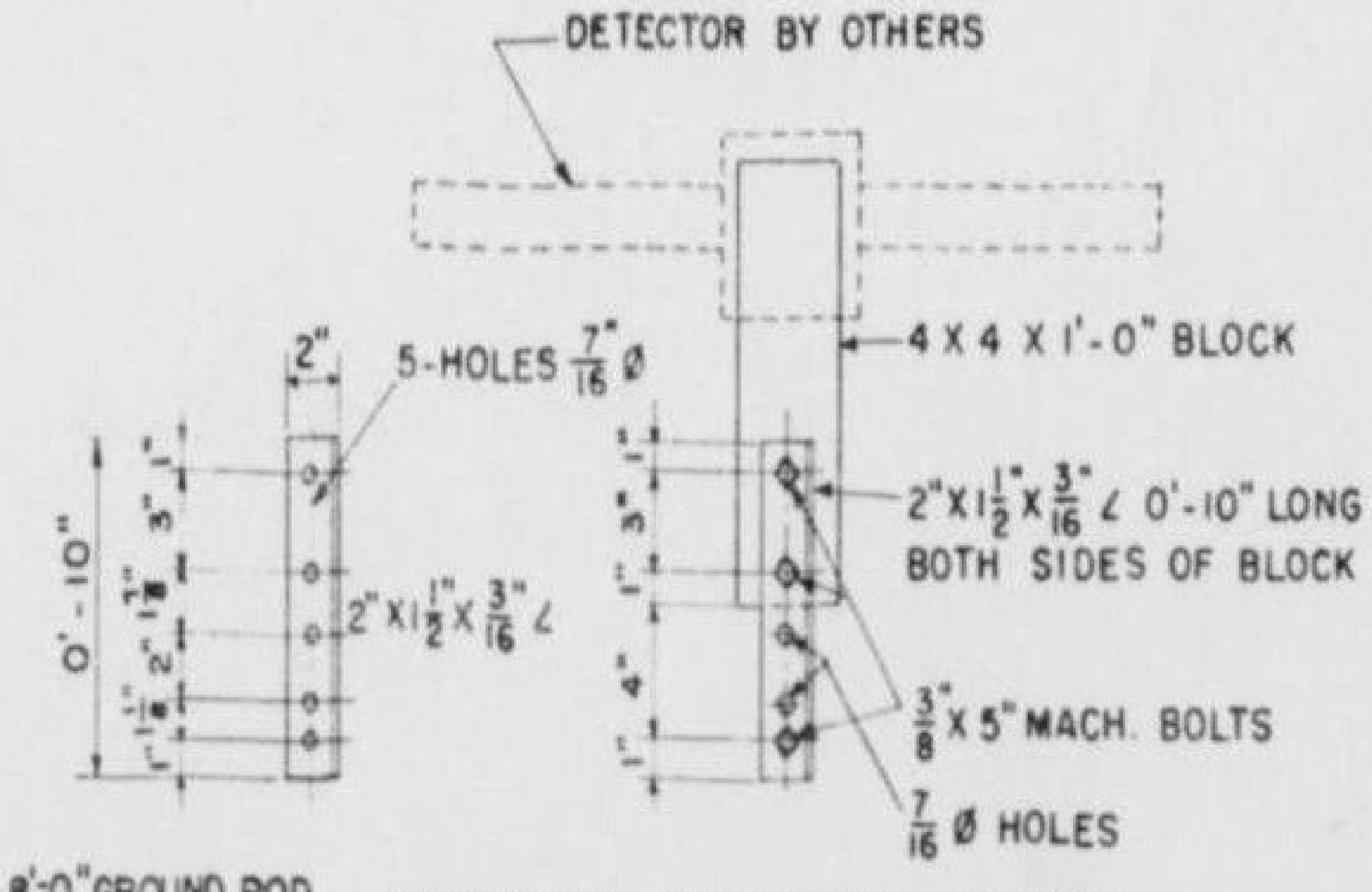
TABLE OF POLE SETTING

LENGTH OF POLE IN FEET	FEET IN CONCRETE
20	3.0
25	3.5
30	3.5
35	4.0
40	4.0
45	4.5
50	4.5

NOTE: MARK ORIGINAL LOCATION OF DETECTOR UNIT ON CROSSARM WITH PAINT AT TIME OF CONSTRUCTION.

PROVIDE FOUR POSTS AROUND EACH DETECTOR POLE, IF NECESSARY, TO PROTECT IT FROM CATTLE.

PAINT ANTENNA MOUNTING BLOCK, CROSSARM AND UNPROTECTED TOP OF POLE THREE COATS OF WHITE PAINT.



ANTENNA MOUNTING BLOCK

NO.	REVISION	DATE	CHECKED
6	ADDED CONDULETS	12-5-52	
5	GR'D. ROD ADDED	10-24-50	
4	ADDED CROSSARM	3-1-49	
3	ADDED CONCRETE BASE	6-10-48	
2	ADDED NOTE TO CABLES	4-4-46	
1	REMOVE GROUND	2-13-45	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

V.H.F. RANGE STATION
FIELD DETECTOR POLE

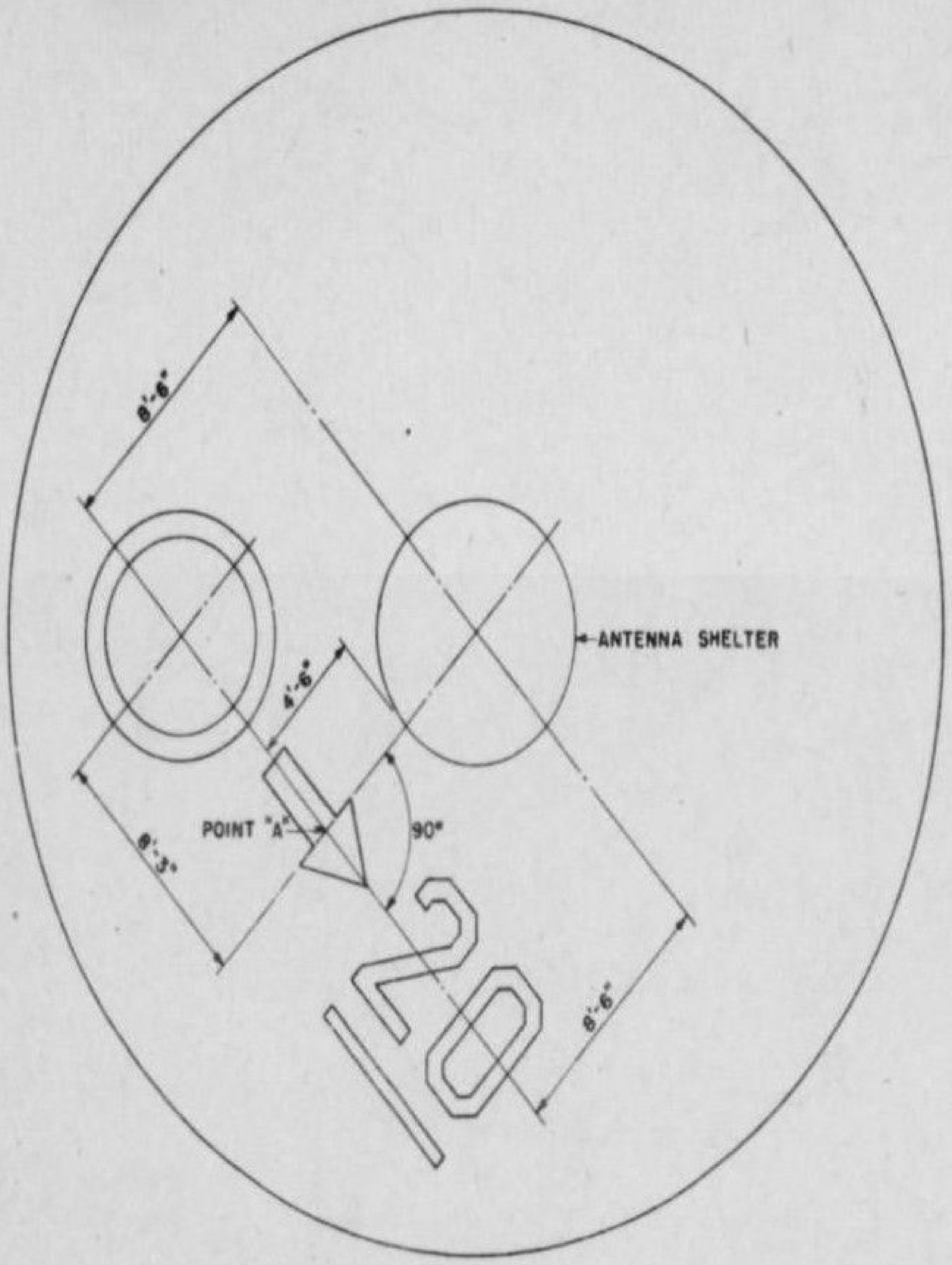
APPROVED: H.W. HOWARD
H.W. Howard
CHIEF: AIRWAYS ENGINEERING DIVISION

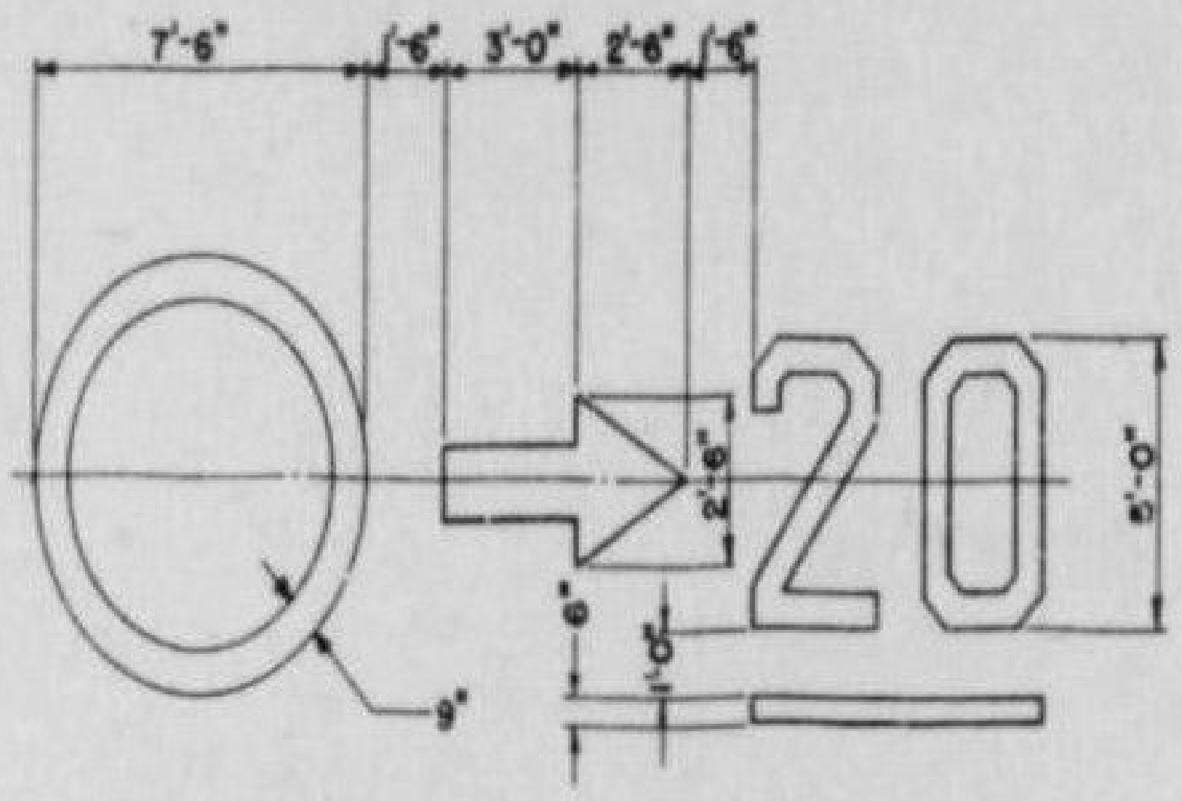
SUBMITTED BY
Hammond
CHIEF OF SECTION

CHECKED:
DESIGNED:
TRACED: J.F.F.
DRAWN: D.H.W.
DATE: 10-21-44

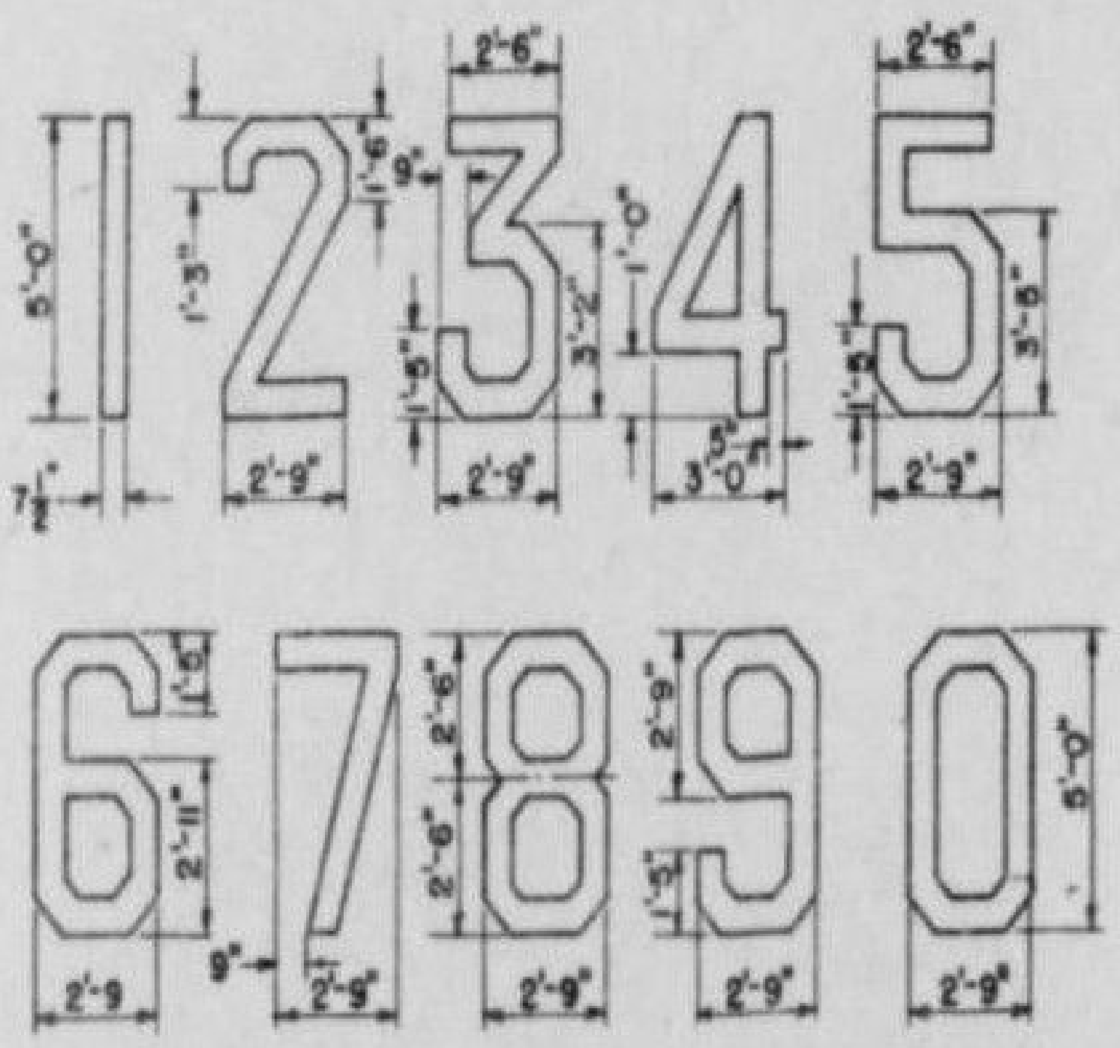
DR. C- 4404

8/7/53 Revised. ordered





LAYOUT OF AIRPORT DIRECTIONAL SYMBOL



LAYOUT OF NUMERALS USED TO DESIGNATE DISTANCE TO LANDING AREA

	1'-3"	1'-0"	0'-9"
1	12345 6890	7	
2345 6890	1	2345 6890	7
7		1	23456 7890

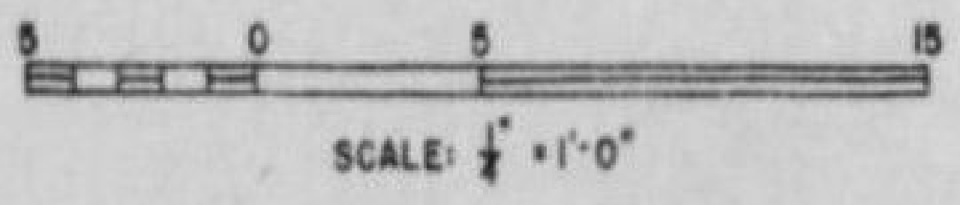
KEY TO DETERMINE SPACING OF NUMERALS

EXAMPLE:

TO DETERMINE SPACE BETWEEN 1 AND 2, FIND 1 IN COLUMN ON THE LEFT. FOLLOW THIS LINE TO THE RIGHT UNTIL YOU FIND 2. FOLLOW THIS COLUMN TO THE TOP OF KEY WHERE DIMENSION WILL BE FOUND IN FEET AND INCHES.

NOTES:

1. POINT "A" IS THE POINT WHERE A LINE PASSING THRU THE CENTER OF THE ANTENNA SHELTER INTERSECTS AT A RIGHT ANGLE (4'-6" FROM THE OUTSIDE DIAMETER OF THE ANTENNA SHELTER) THE LINE DESIGNATING THE AZIMUTH TO THE NEAREST GOOD LANDING AREA. THIS LINE ALSO SERVES AS THE CENTER LINE OF THE AIRPORT DIRECTIONAL SYMBOL.
2. MARKER COMPONENTS TO BE PAINTED BLACK (FED. SPEC. TT-P-61) ON CHROME YELLOW BACKGROUND. (FED. SPEC. TT-E-489)



SCALE: 1/4" = 1'-0"

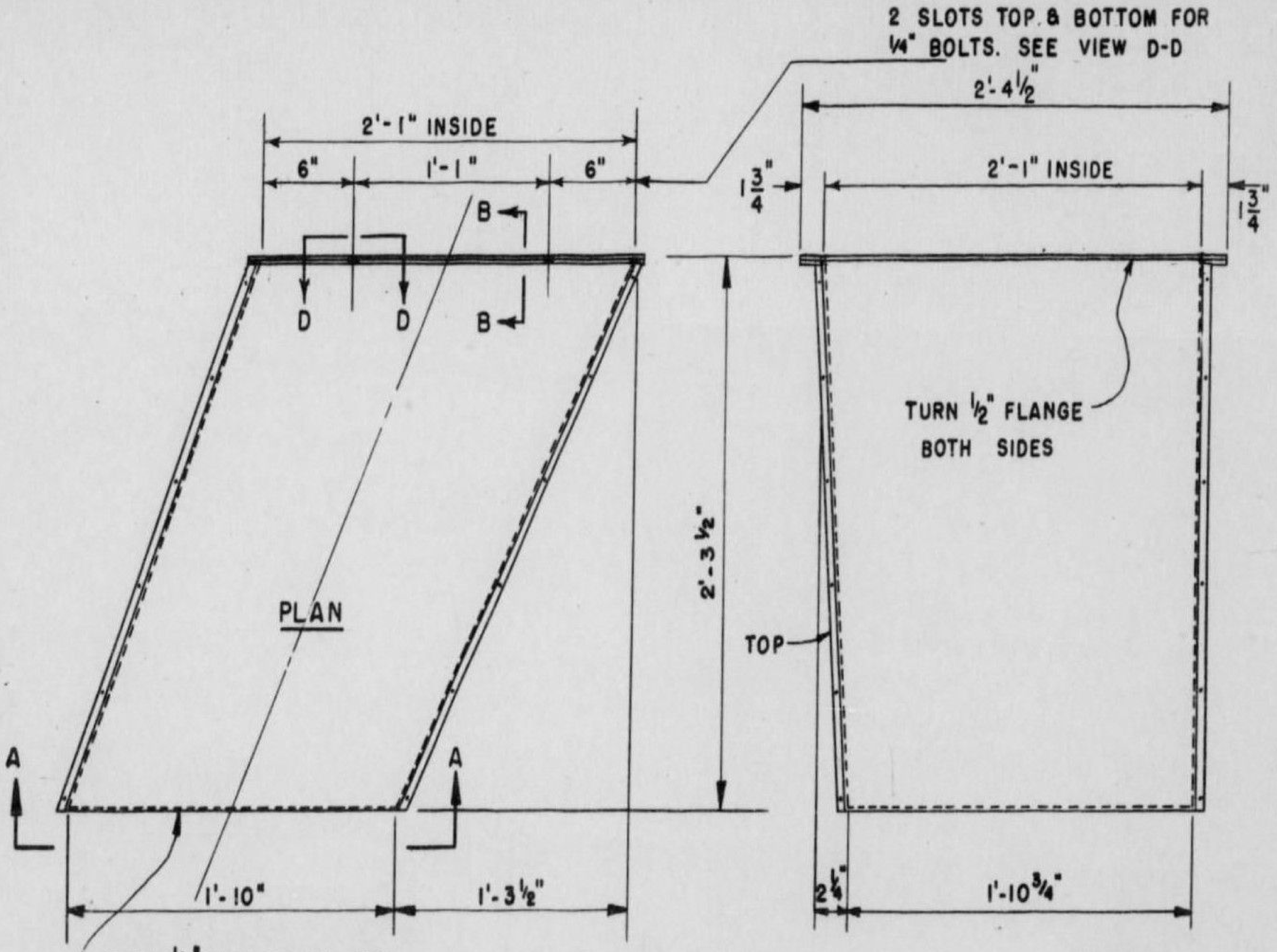
NO.	REVISION	DATE	CHECKED
5	REMOVED "SUPERSEDED" NOTE	4-13-51	
4	CHANGED TO CIRCULAR DECK	6-5-50	
3	REVISED NOTE 2	5-1-50	
2	REDRAWN - REVISED FOR SOLID COUNTERPOISE WITH CIRCULAR ANTENNA SHELTER	4-6-50	

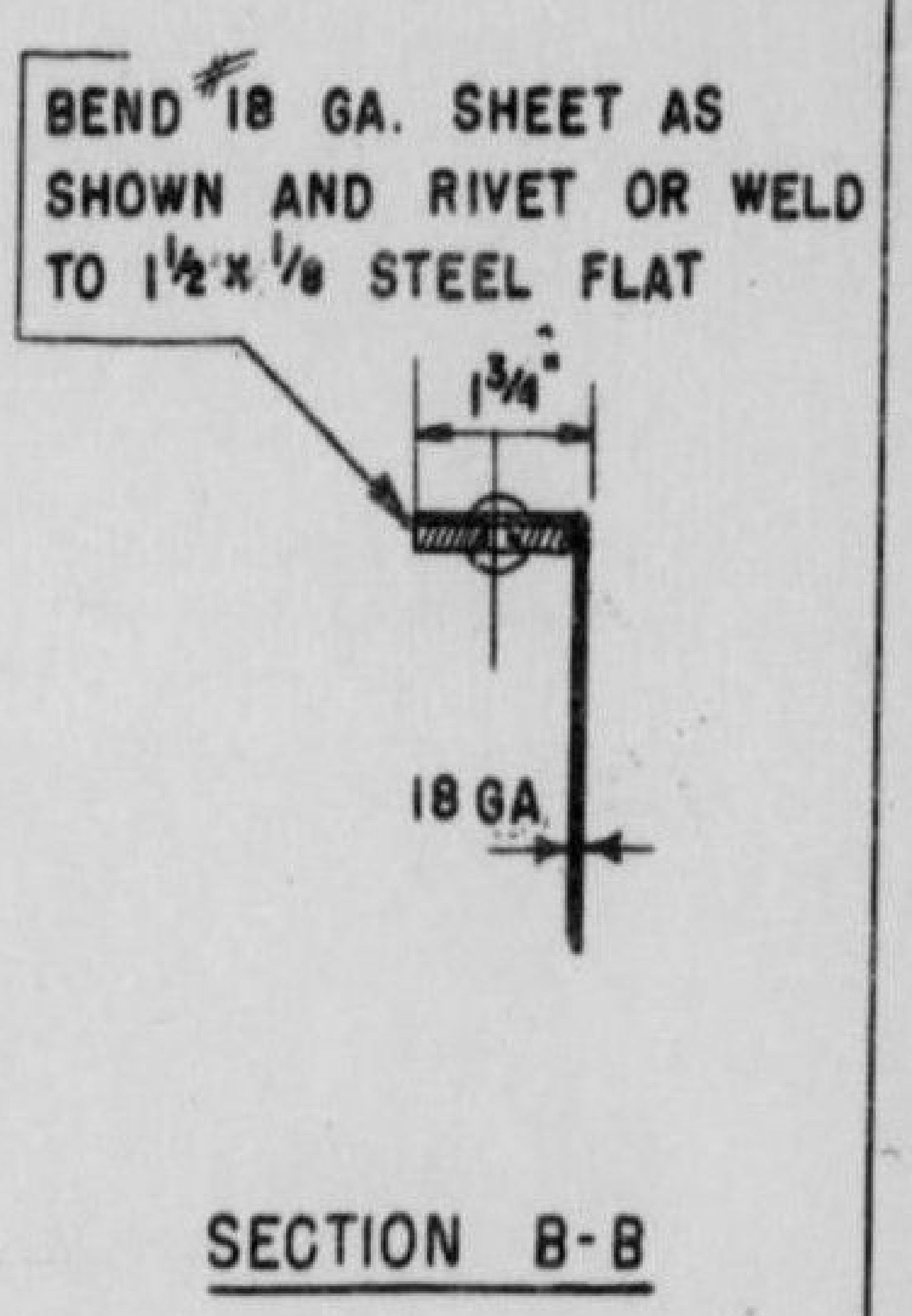
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

AIR MARKING LAYOUT
FOR VHF OMNI RANGE FACILITY
(SOLID COUNTERPOISE AND CIRCULAR
ANTENNA SHELTER)

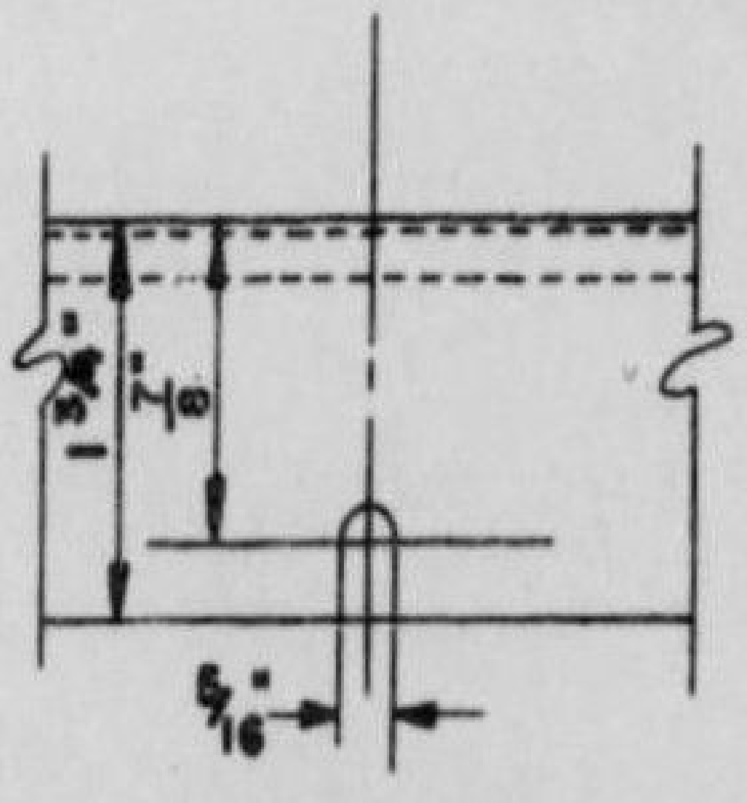
APPROVED: H. W. HOWARD
CHIEF AIRWAYS ENGINEERING DIVISION
R. J. [illegible]
DRAWN: D.T.
TRACED: D.T.
DATE: 2-20-47
DR. D-4324-40

52527

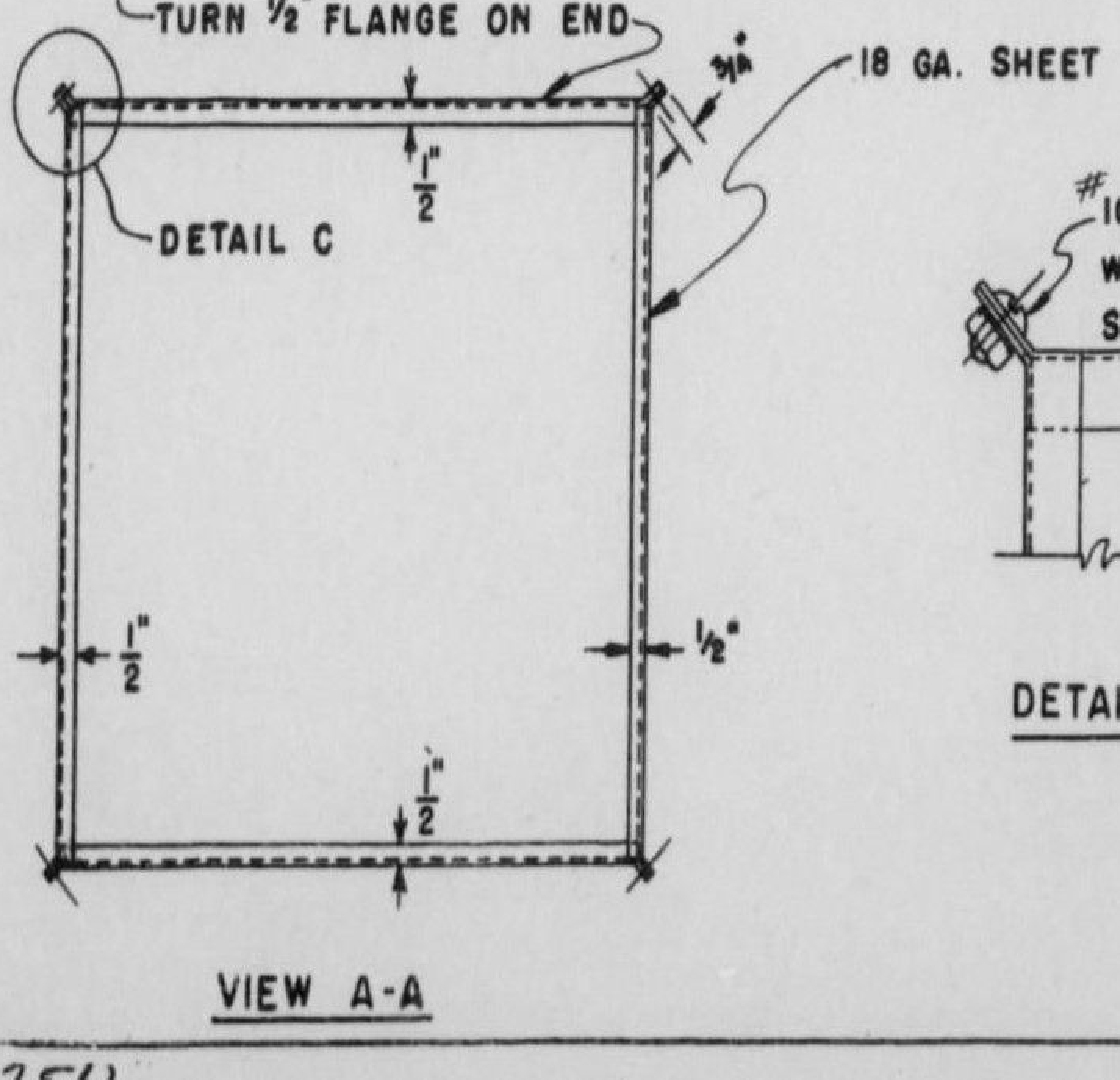



BEND #18 GA. SHEET AS SHOWN AND RIVET OR WELD TO 1 1/2" x 1/8 STEEL FLAT
1 3/4"
18 GA.

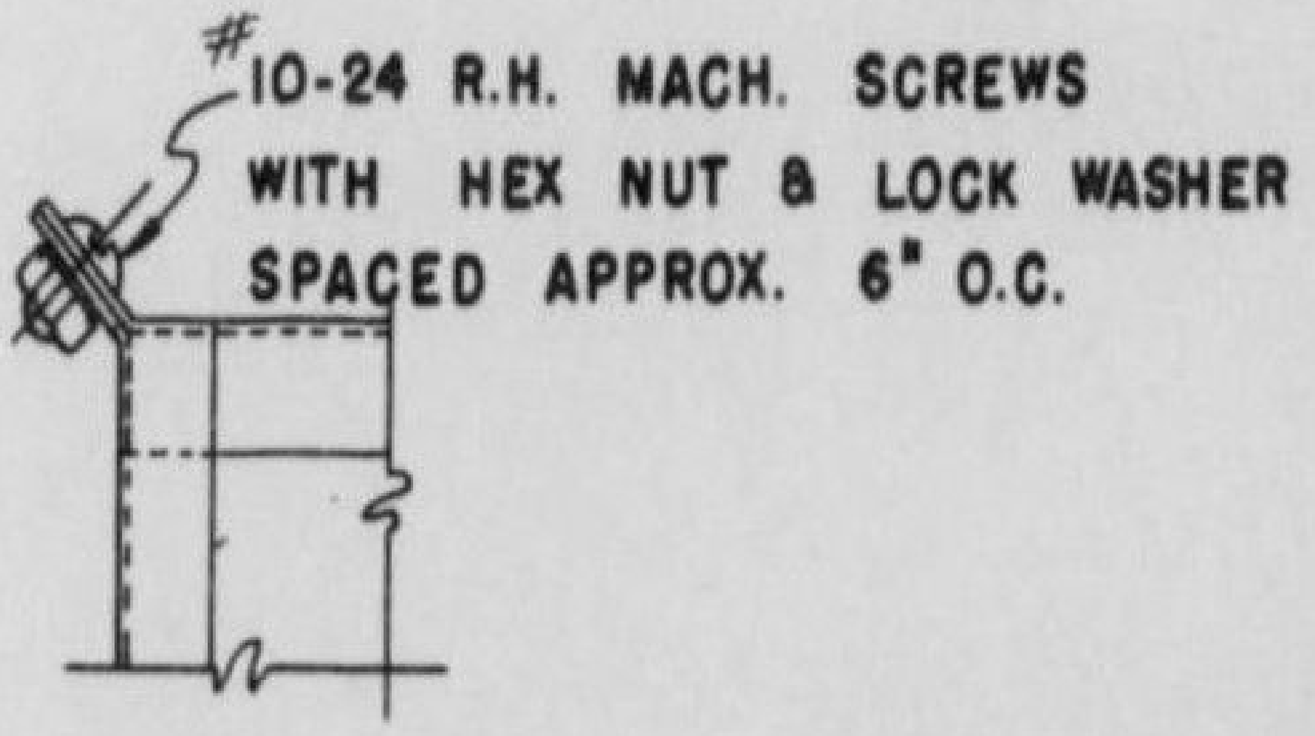
SECTION B-B



VIEW D-D



VIEW A-A


#10-24 R.H. MACH. SCREWS WITH HEX NUT & LOCK WASHER SPACED APPROX. 6" O.C.

DETAIL C

NOTES:-

1. MAKE FROM NO. 18 GAUGE SHEET METAL.
2. FURNISH DUCT KNOCKED DOWN.
3. FURNISH 5-1/4"X3" GALV. CARRIAGE BOLTS WITH HEX. NUTS & WASHERS.
4. FURNISH NO. 10-24 R.H. STEEL MACHINE SCREWS WITH NUTS & LOCK WASHERS.

NO.	REVISION	DATE	CK'D
1	1'-3 1/2" WAS 1'-2"	5-21-45	[illegible]

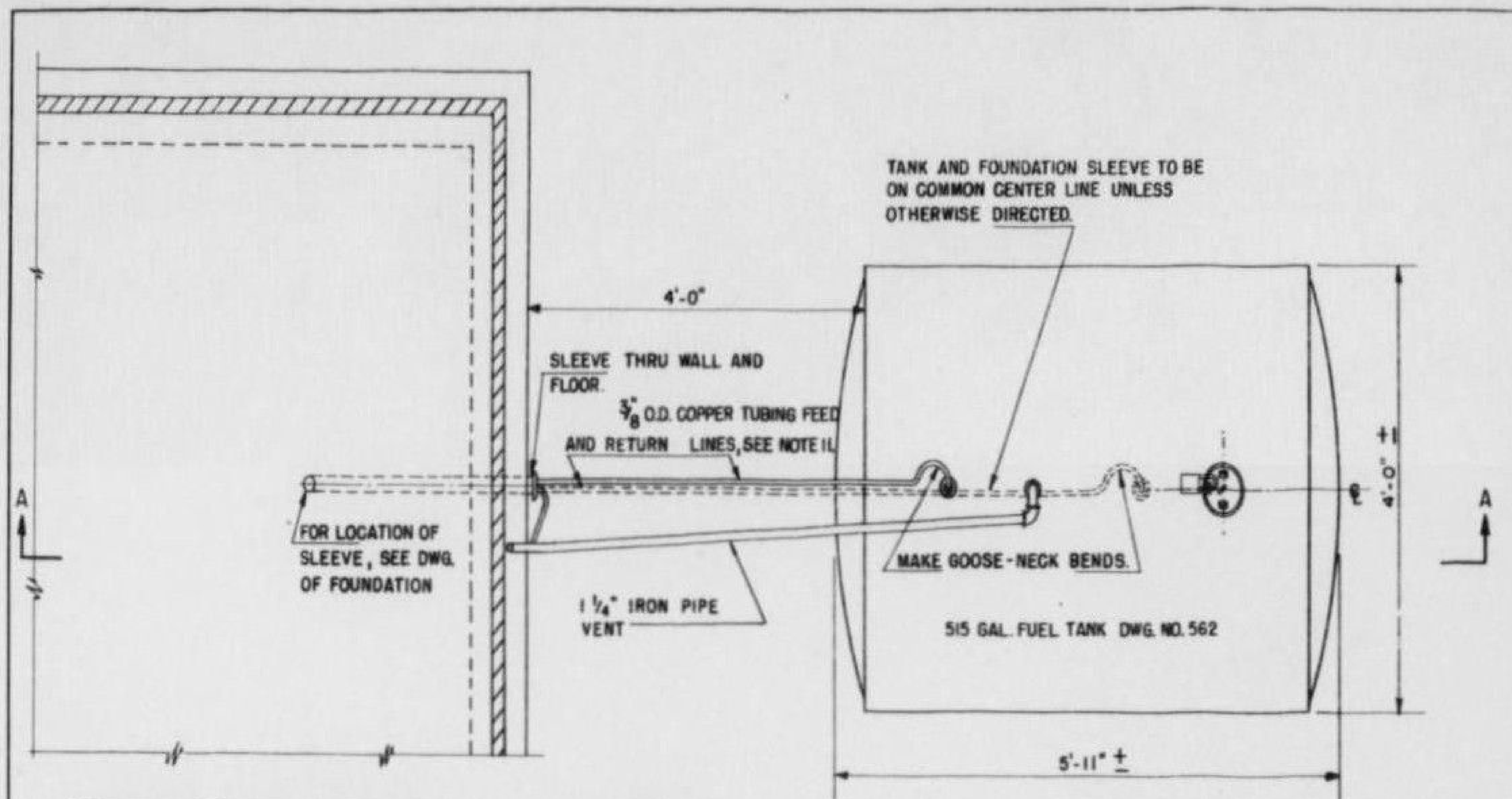
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

TYPE "S" BUILDING
REMOVABLE METAL AIR DUCT
FOR 8 KVA ENGINE-GENERATOR

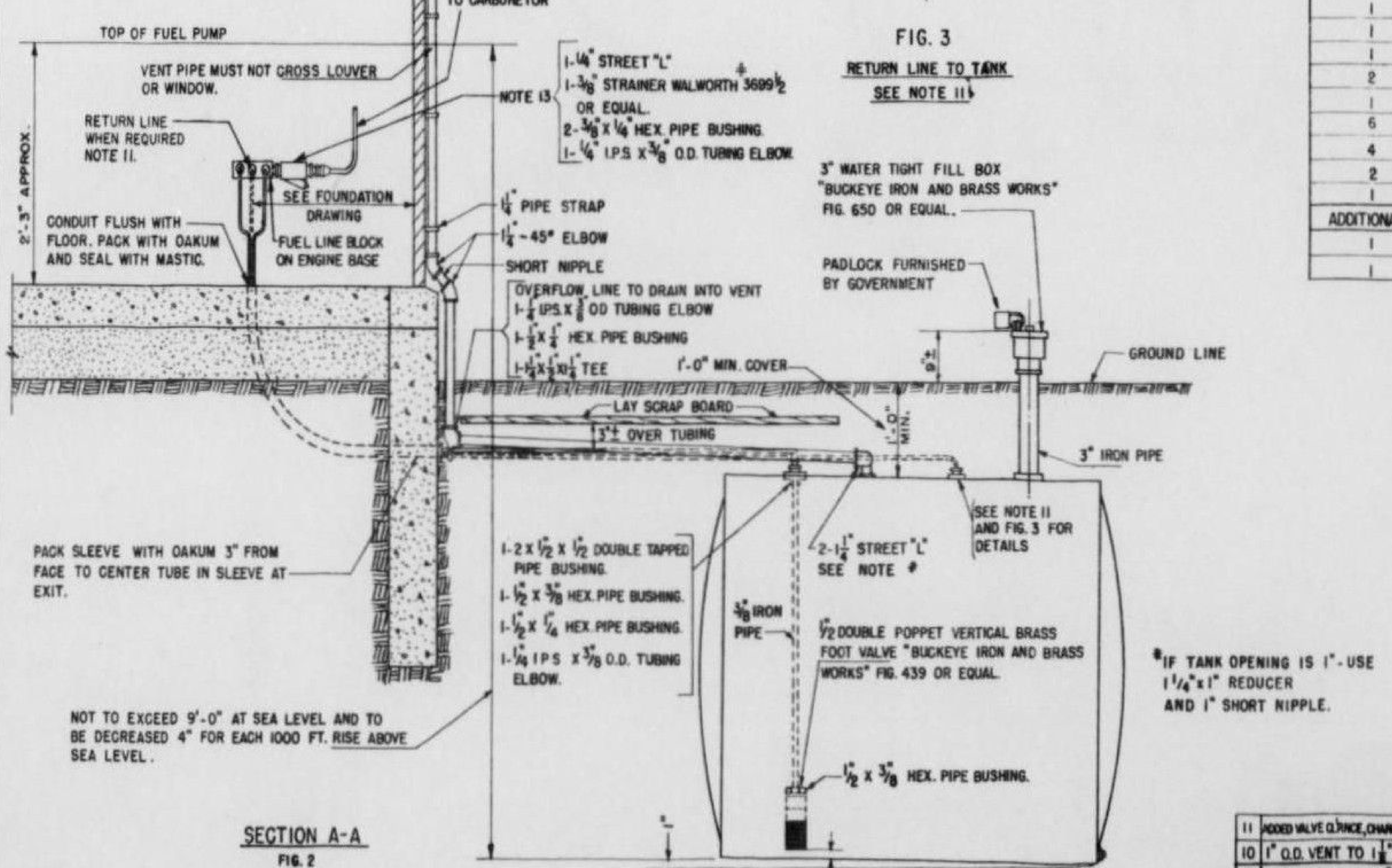
APPROVED: [illegible] CHIEF: AIRWAYS ENG. DIV.	SUBMITTED L. Hammond CHIEF OF SECTION
DR. BY JHS CK. BY [illegible]	DATE 1-9-45
DR. B-3317-11	

21250

K & E CO., N.Y.


TANK AND FOUNDATION SLEEVE TO BE ON COMMON CENTER LINE UNLESS OTHERWISE DIRECTED.
4'-0"
SLEEVE THRU WALL AND FLOOR.
⅜" O.D. COPPER TUBING FEED AND RETURN LINES, SEE NOTE 11.
FOR LOCATION OF SLEEVE, SEE DWG. OF FOUNDATION
1¼" IRON PIPE VENT
MAKE GOOSE-NECK BENDS.
515 GAL. FUEL TANK DWG. NO. 562
4'-0" ±
5'-11" ±
A
A

PLAN
(EARTH REMOVED)
FIG. 1


1¼" SCREENED "T" VENT FURNISHED WITH FUEL TANK 12' MIN. ABOVE FILLER CAP.
TYPE "S" BLDG.
FOR VOR RANGE WITH COUNTERPOISE ROOF, VENT HEADER SHALL BE TERMINATED APPROX. 2" UNDER COUNTERPOISE.
45° ELLS
OVERFLOW LINE TO CARBURETOR
TOP OF FUEL PUMP
VENT PIPE MUST NOT CROSS LOUVER OR WINDOW.
NOTE 13
1-¼" STREET "L"
1-⅜" STRAINER WALWORTH 3699½ OR EQUAL.
2-⅜" X ¼" HEX. PIPE BUSHING.
1-¼" I.P.S. X ⅜" O.D. TUBING ELBOW.
RETURN LINE WHEN REQUIRED NOTE 11.
2'-3" APPROX.
SEE FOUNDATION DRAWING
CONDUIT FLUSH WITH FLOOR. PACK WITH OAKUM AND SEAL WITH MASTIC.
FUEL LINE BLOCK ON ENGINE BASE
1¼" PIPE STRAP
1¼" - 45° ELBOW
SHORT NIPPLE
OVERFLOW LINE TO DRAIN INTO VENT
1-¼" I.P.S. X ⅜" OD TUBING ELBOW
1-½" X ¼" HEX. PIPE BUSHING
1-1¼" X ½" X 1¼" TEE
1'-0" MIN. COVER
LAY SCRAP BOARD
3" ± OVER TUBING
3" WATER TIGHT FILL BOX "BUCKEYE IRON AND BRASS WORKS" FIG. 650 OR EQUAL.
PADLOCK FURNISHED BY GOVERNMENT
GROUND LINE
3" IRON PIPE
SEE NOTE 11 AND FIG. 3 FOR DETAILS
PACK SLEEVE WITH OAKUM 3" FROM FACE TO CENTER TUBE IN SLEEVE AT EXIT.
1-2 X ½" X ½" DOUBLE TAPPED PIPE BUSHING.
1-½" X ⅜" HEX. PIPE BUSHING.
1-½" X ¼" HEX. PIPE BUSHING.
1-¼" IPS X ⅜" O.D. TUBING ELBOW.
2-1¼" STREET "L" SEE NOTE *
⅜" IRON PIPE
½" DOUBLE POPPET VERTICAL BRASS FOOT VALVE "BUCKEYE IRON AND BRASS WORKS" FIG. 439 OR EQUAL.
½" X ⅜" HEX. PIPE BUSHING.
NOT TO EXCEED 9'-0" AT SEA LEVEL AND TO BE DECREASED 4" FOR EACH 1000 FT. RISE ABOVE SEA LEVEL.

*IF TANK OPENING IS 1" - USE
1¼" x 1" REDUCER
AND 1" SHORT NIPPLE.

SECTION A-A
FIG. 2

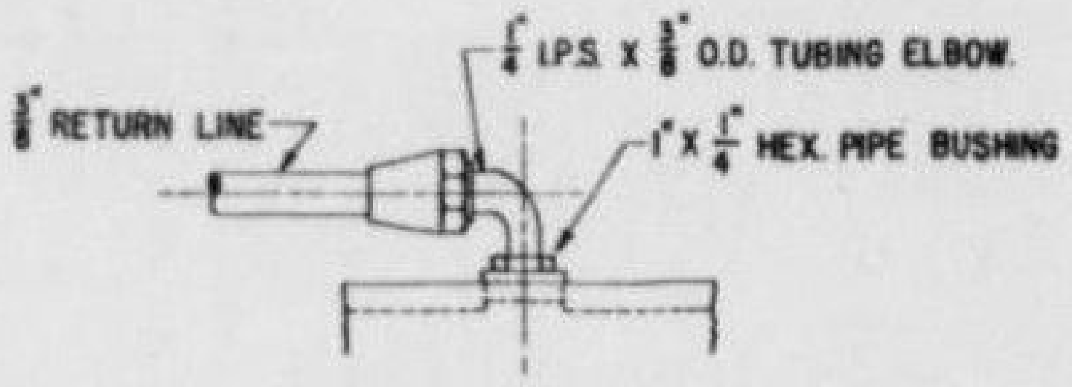


FIG. 3
RETURN LINE TO TANK
SEE NOTE 11

NOTES

1A. TUBING FITTINGS TO BE FURNISHED COMPLETE WITH NUTS AND/OR SLEEVES NECESSARY TO COMPLETE THE TUBING CONNECTION INDICATED.

1B. ALL TUBE FITTINGS SHALL BE BRASS OF EITHER THE FLARED OR COMPRESSION-SLEEVE TYPES, CONFORMING TO S.A.E. STANDARDS FOR FLARED-TUBE FITTINGS OR COMPRESSION-SLEEVE FITTINGS, RESPECTIVELY.

2. TUBING SHALL BE OF THE O.D. SIZES SHOWN, OF SEAMLESS SOFT ANNEALED COPPER WITH 0.049" WALL THICKNESS.

3. TUBING SHALL BE CUT ONLY WITH APPROVED TUBING CUTTERS OR SAWS, AND ALL BURRS REMOVED PRIOR TO INSTALLING FITTINGS. FLARED TUBING ENDS SHALL BE MADE ONLY WITH APPROVED TYPE FLARING TOOLS OF PROPER SIZE.

4. ALL IRON PIPE AND FITTINGS SHALL BE GALVANIZED.

5. THREADED PIPE CONNECTIONS SHALL BE MADE WITH LITHARGE AND GLYCERINE.

6. TANK AND PIPING CONNECTION SHALL BE TESTED UNDER FIVE POUNDS AIR PRESSURE. HOLD FOR ½ HOUR.

7. PAINT TANK TWO COATS OF ASPHALT PAINT OVER A RED LEAD PRIMING COAT.

8. IF ENGINE GENERATOR IS NOT AVAILABLE, LEAVE 6 FT. OF SUPPLY, RETURN AND OVERFLOW TUBING LINES FOR FUTURE CONNECTIONS.

9. PLACE MOUND OF DIRT OVER TANK TO OBTAIN REQUIRED COVER WHERE NECESSARY.

10. IF REQUIRED, ANCHOR TANK AS SHOWN ON DRAWING NO. A-1609.

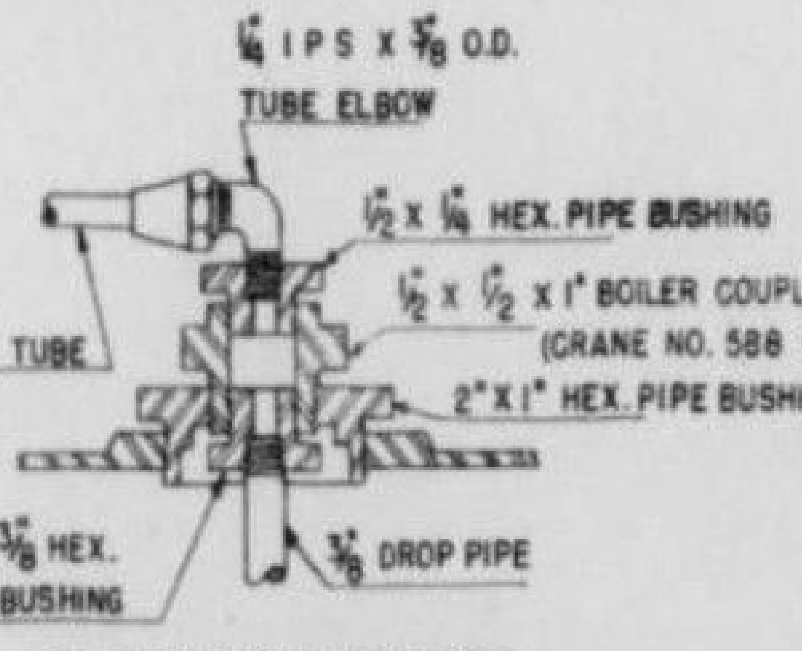
11. WHEN ENGINE-GENERATOR HAS PRESSURE CIRCULATING FUEL SYSTEM, A RETURN LINE SHALL BE RUN TO THE TANK.

12. UNLESS OTHERWISE SPECIFIED IN THE PROPOSAL COPPER TUBING FOR SUPPLY, RETURN AND OVERFLOW LINES, TOGETHER WITH FITTINGS FOR CONNECTING TO ENGINE ONLY ARE FURNISHED WITH THE ENGINE GENERATOR.

13. INSTALL IF NOT ORIGINALLY FURNISHED WITH ENGINE. REMOVE STRAINER FROM WALWORTH #3699½ AND REPLACE WITH 2 THICKNESSES OF NON FERROUS METALLIC SCREEN 40 MESH, #33 WIRE.

LIST OF PARTS FOR 515 GALLON FUEL TANK
UNDERGROUND INSTALLATION

NO. REQ'D.	PART
1	515 GALLON FUEL TANK.
35' (APPROX)	⅜" O.D. COPPER TUBING.
30' (APPROX)	1¼" IRON PIPE
1'-6" (APPROX)	3" IRON PIPE.
4' (APPROX)	⅜" IRON PIPE.
1	1¼" SCREENED "T" VENT.
1	3" WATER TIGHT FILL BOX BUCKEYE FIG. 650"
2	3/8" X 1/4" HEX. PIPE BUSHING
4	¼" IPS X ⅜" O.D. TUBING ELBOW.
2	1¼"-STREET "L"
1	1¼" SHORT NIPPLE
1	1" X ¼" HEX. PIPE BUSHING.
1	½" BRASS FOOT VALVE, BUCKEYE FIG. 439" OR EQUAL.
1	1¼" X ½" X 1¼" TEE
2	½" X ⅜" HEX. PIPE BUSHING.
1	2" X ½" X ½" DOUBLE TAPPED PIPE BUSHING.
6	1¼" PIPE STRAPS
4	1¼"-45° ELBOWS
2	½" X ¼" HEX. PIPE BUSHING.
1	¼" STREET "L"
ADDITIONAL PARTS REQUIRED FOR EMERGENCY ALTERNATE	
1	½" X ½" X 1" BOILER COUPLING (CRANE #588)
1	2" X 1" HEX BUSHING


¼" I P S X ⅜" O.D. TUBE ELBOW
½" X ¼" HEX. PIPE BUSHING
½" X ½" X 1" BOILER COUPLING (CRANE NO. 588 OR EQUAL.)
2" X 1" HEX. PIPE BUSHING
⅜ O.D. COPPER TUBE
½" X ⅜" HEX. PIPE BUSHING
⅜" DROP PIPE

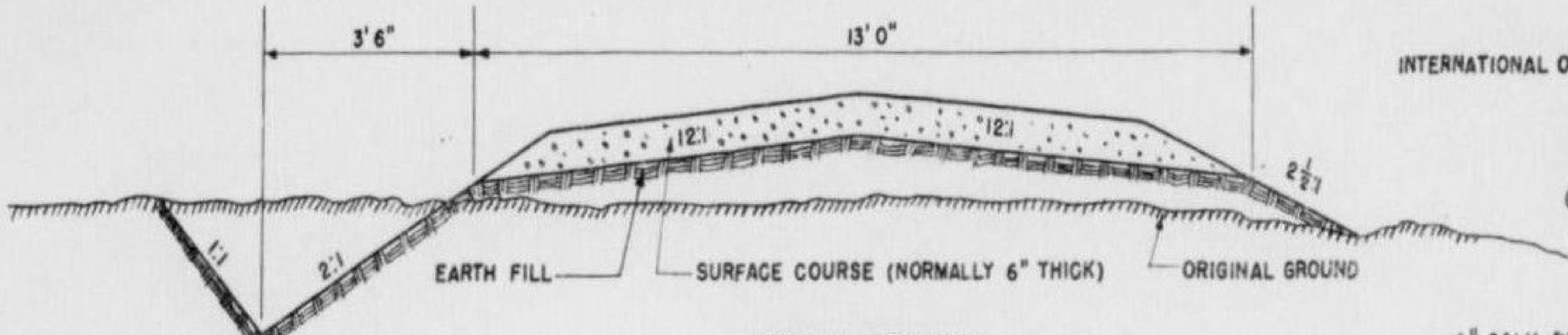
EMERGENCY ALTERNATE
SUPPLY LINE TANK FITTINGS
FIG. 4

NO.	REVISION	DATE	CHECKED
11	ADDED VALVE CL'NCE, CHANGED FUEL LINES & 1¼" PIPE	2-12-52	
10	1" O.D. VENT TO 1¼" O.D.	12-28-49	
9	REVISE TO SHOW 1" VENT LINE	5-19-49	
8	CHANGED CONC. BASE AT FILL BOX	10-22-46	
7	REDRAWN DUE TO GENERAL REVISION	6-20-47	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

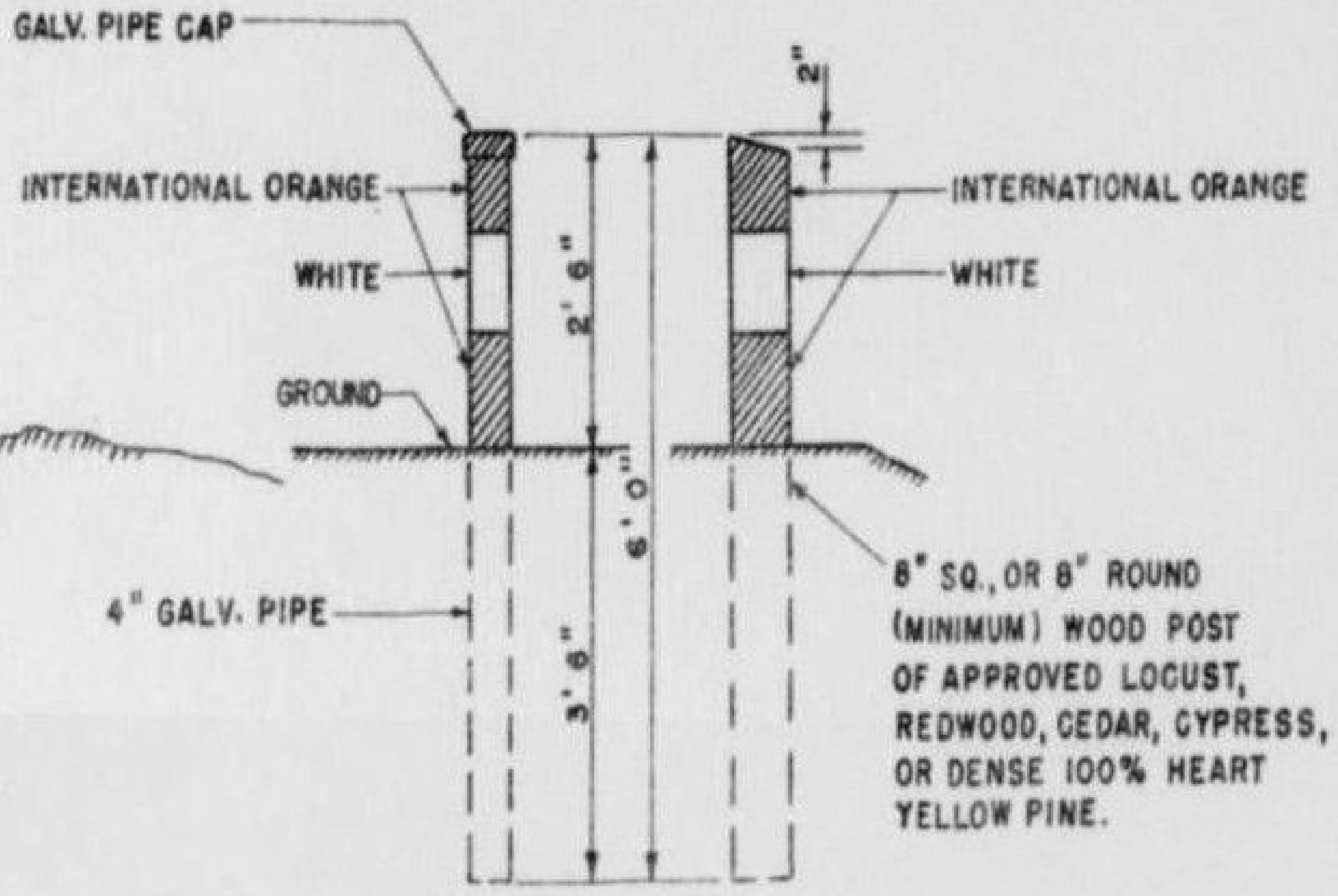
FUEL LINE LAYOUT UNDERGROUND FUEL TANK

APPROVED: THOS. B. BOURNE
TBB
CHIEF AIRWAYS ENGINEERING DIVISION
SUBMITTED BY:
CHECKED:
DESIGNED:
DRAWN: J.H.S.
TRACED D.K.W.
DATE: 2-14-40
DR. D-2111-1



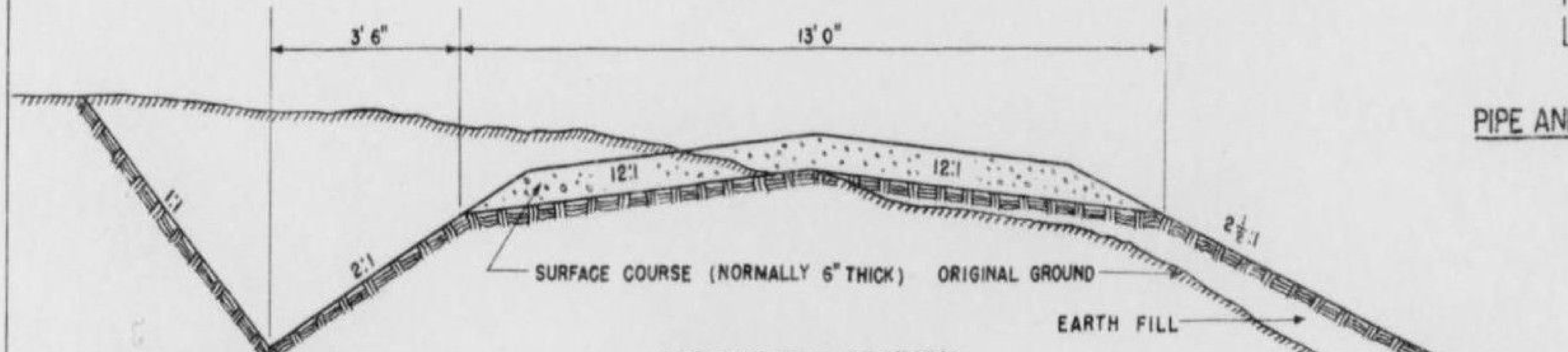
NORMAL SECTION

FIG. 1


GALV. PIPE CAP
2"
INTERNATIONAL ORANGE
WHITE
GROUND
2' 6"
6' 0"
3' 6"
4" GALV. PIPE
INTERNATIONAL ORANGE
WHITE
8" SQ., OR 8" ROUND (MINIMUM) WOOD POST OF APPROVED LOCUST, REDWOOD, CEDAR, CYPRESS, OR DENSE 100% HEART YELLOW PINE.

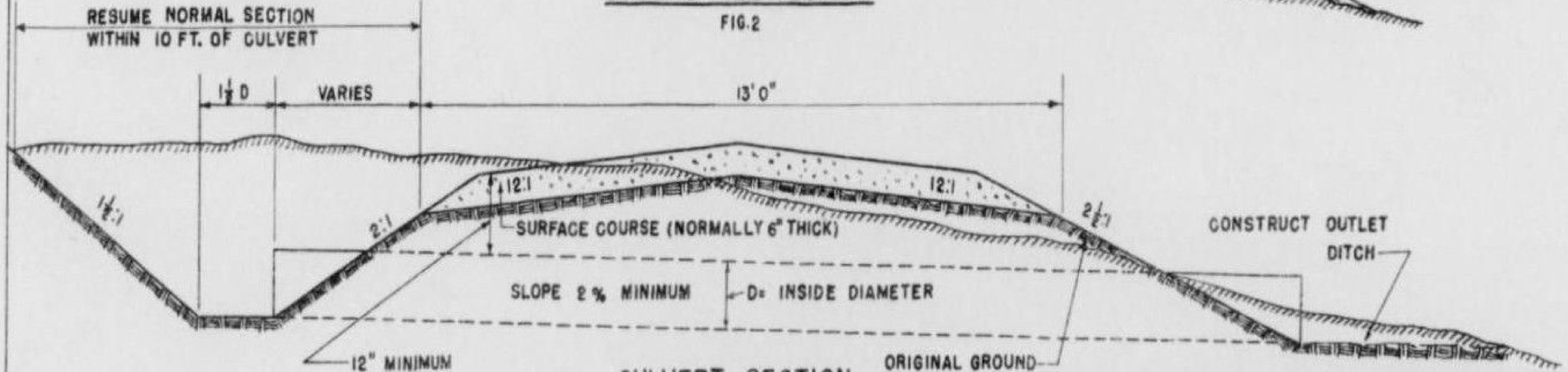
PIPE AND WOOD GUARD POSTS

FIG. 5



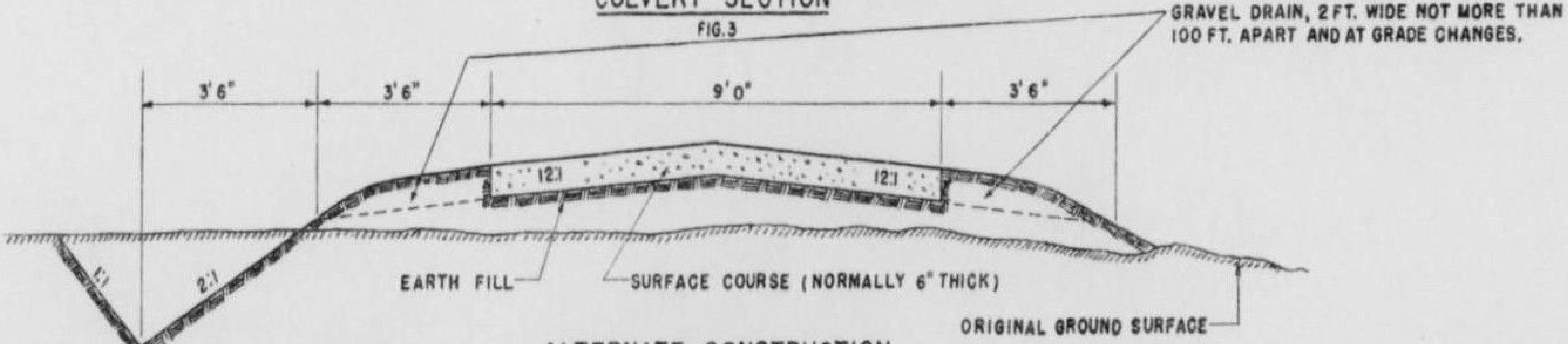
CUT AND FILL SECTION

FIG. 2



CULVERT SECTION

FIG. 3


GRAVEL DRAIN, 2 FT. WIDE NOT MORE THAN 100 FT. APART AND AT GRADE CHANGES.
3'6"
3'6"
9'0"
3'6"
12:1
12:1
1:1
2:1
EARTH FILL
SURFACE COURSE (NORMALLY 6" THICK)
ORIGINAL GROUND SURFACE

ALTERNATE CONSTRUCTION

FIG. 4

NOTES :-

1. THE FIELD ENGINEER AT TIME OF SITE SELECTION AND SURVEY SHOULD MAKE DEFINITE RECOMMENDATION AS TO TYPE OF DRIVEWAY BEST SUITED FOR THE SITE.
2. LOCAL CONDITIONS MAY MODIFY THE TYPICAL SECTIONS SHOWN HEREON. SEE PLOT LAYOUT DRAWING FOR DETAILS OF DRIVEWAY TO BE CONSTRUCTED.
3. SEE PLOT LAYOUT DRAWING FOR DETAILS OF BOX CULVERTS, BRIDGES, OR OTHER STRUCTURES REQUIRED.
4. SURFACE COURSES SHALL BE GRAVEL, STONE OR OTHER ACCEPTABLE LOCAL MATERIAL COMPACTED BY TRAFFIC TO THE THICKNESS ORDERED BY THE GOVT'S REPRESENTATIVES.
5. GUARD POSTS OF TYPES SPECIFIED SHALL BE INSTALLED AT LOCATIONS SHOWN OR WHERE ORDERED.
6. VARY DEPTHS OF DITCH TO PROVIDE NECESSARY FILL.
7. DRIVEWAY TO CONFORM TO SPECIFICATION CAA 95.

NO.	REVISION	DATE	CHECKED
4	REDRAWN FOR GENERAL REVISION	6-20-47	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

DRIVEWAY CROSS SECTIONS

APPROVED: H.W. HOWARD HWH
CHIEF: AIRWAYS ENGINEERING DIVISION

SUBMITTED BY:
CHIEF OF SECTION

CHECKED
DESIGNED BY:
TRACED BY: G.T.O.
DRAWN BY: E.W.G.
DATE: 2-15-39

DR. C- 2107

2.305

SPACE FOR POWER COMPANY'S CONNECTION TO POLE
POWER CO'S LINE
12"
25 FT. POLE SET 4.5 FT. IN GROUND POLE CLASS 5 SO. YELLOW PINE OR DOUGLAS FIR, PRESSURE CREOSOTED
TYPE F CONDUIT FITTING
CONDUIT CLAMPS
ALL FITTINGS ETC. ON SIDE OF POLE FACING RADIO BLDG.
2 OR 3 R.C. WIRES AS REQUIRED EXTENDING 3-FT. BEYOND FITTING. NO. 4 WIRE UNLESS OTHERWISE SPECIFIED.
1¼" FIBER OR METAL'IC CONDUIT AS REQUIRED BY POWER COMANY.
METER RING OR BOX OF TYPE SPECIFIED BY POWER COMPANY
GROUND METER BOX AND SWITCH BOX WITH NO. 6 BARE COPPER WIRE
CONDUIT NIPPLE
SEE POWER COMPANY
RAINTIGHT SAFETY SWITCH - 230 V. WITH PADLOCK FOR LOCKING IN "ON" OR "OFF" POSITIONS. RATING AS REQUIRED.
GALVANIZED CONDUIT RISER SIZE TO SUIT CABLE.
4'-0" MIN.
PIPE CLAMP
6"
6"
GROUND
GROUND ROD
BUSHING
18"
36" WHEN GOVT. FENCED AREA.

REVISION	
DATE	CHECKED
6-15-50	RLH

REVISION	
DATE	CHECKED
8-18-44	RLH
6-22-44	RLH
7-19-44	RLH
12-28-44	RLH
2-24-45	RLH
12-20-48	RLH

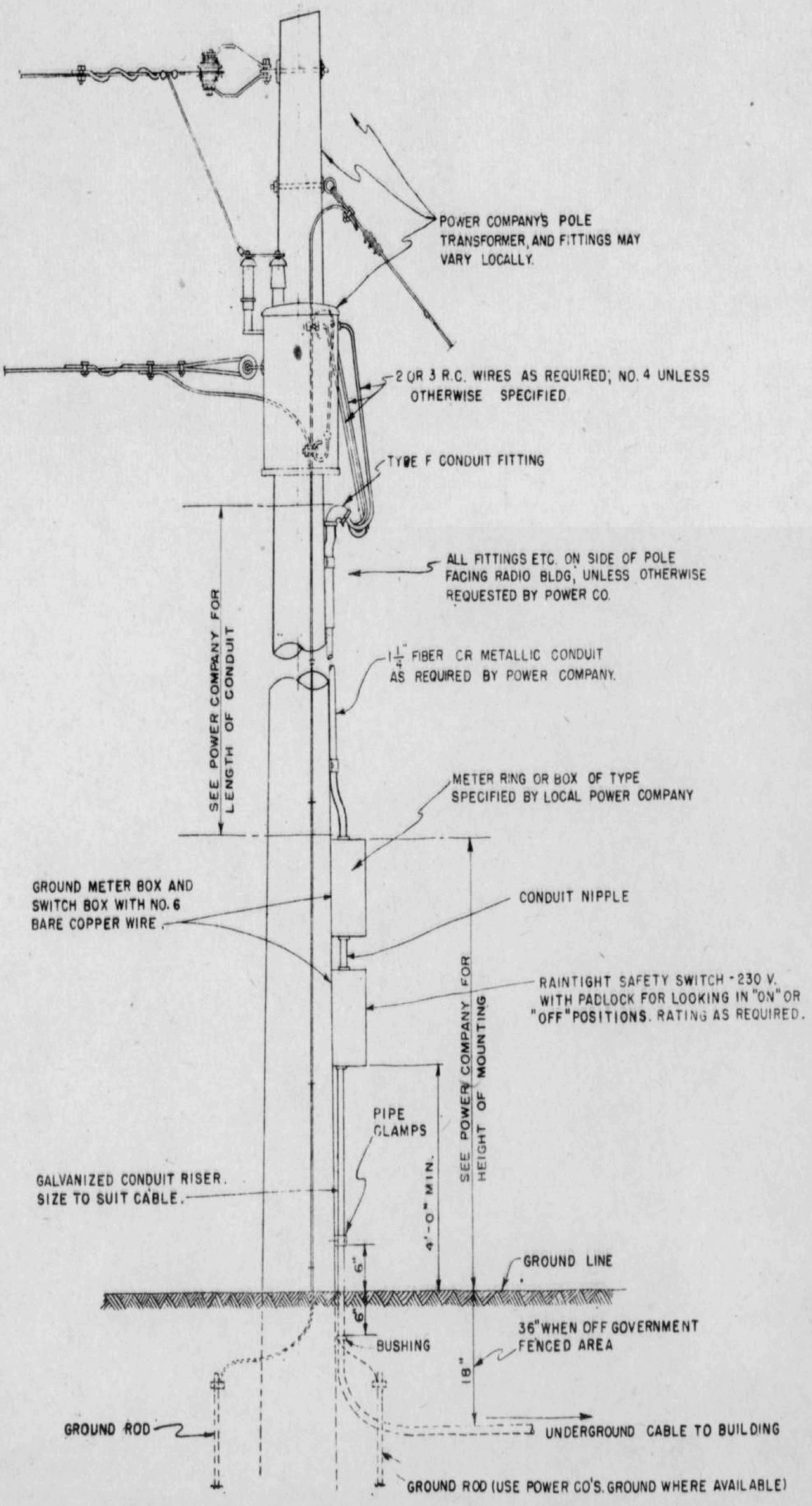
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

TERMINAL POLE
(GOVERNMENT)
FOR UNDERGROUND CABLE

APPROVED: THOS. B. BOURNE
CHIEF OF DIVISION
SUBMITTED:
CHIEF OF SECTION
DR. BY J.F.F.
DATE 7-16-40
DR. B-2106-1

SUPERSEDES DWG. NO. A-2106

23051


POWER COMPANY'S POLE TRANSFORMER, AND FITTINGS MAY VARY LOCALLY.
2 OR 3 R.C. WIRES AS REQUIRED; NO. 4 UNLESS OTHERWISE SPECIFIED.
TYPE F CONDUIT FITTING
ALL FITTINGS ETC. ON SIDE OF POLE FACING RADIO BLDG, UNLESS OTHERWISE REQUESTED BY POWER CO.
SEE POWER COMPANY FOR LENGTH OF CONDUIT
1¼" FIBER OR METALLIC CONDUIT AS REQUIRED BY POWER COMPANY.
METER RING OR BOX OF TYPE SPECIFIED BY LOCAL POWER COMPANY
GROUND METER BOX AND SWITCH BOX WITH NO. 6 BARE COPPER WIRE.
CONDUIT NIPPLE
RAINTIGHT SAFETY SWITCH - 230 V. WITH PADLOCK FOR LOOKING IN "ON" OR "OFF" POSITIONS. RATING AS REQUIRED.
SEE POWER COMPANY FOR HEIGHT OF MOUNTING
4'-0" MIN.
PIPE CLAMPS
GALVANIZED CONDUIT RISER. SIZE TO SUIT CABLE.
6"
6"
GROUND LINE
BUSHING
36" WHEN OFF GOVERNMENT FENCED AREA
18"
GROUND ROD
UNDERGROUND CABLE TO BUILDING
GROUND ROD (USE POWER CO'S. GROUND WHERE AVAILABLE)

NO	REVISION	DATE	CHECKED
6	SWITCH ADDED	6-15-50	
5	ADDED NOTE TO 1¼" CONDUIT	12-20-46	
4	ADDED THIRD WIRE	2-24-45	
3	REMOVED CABLE SEAL, ADDED TERMINAL TUBE	12-28-44	
2	ADDED CABLE SEAL	7-19-44	
1	NEUTRAL ON BOTTOM - TITLE	6-21-44	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

TERMINAL POLE
(POWER COMPANY)
FOR UNDERGROUND CABLE

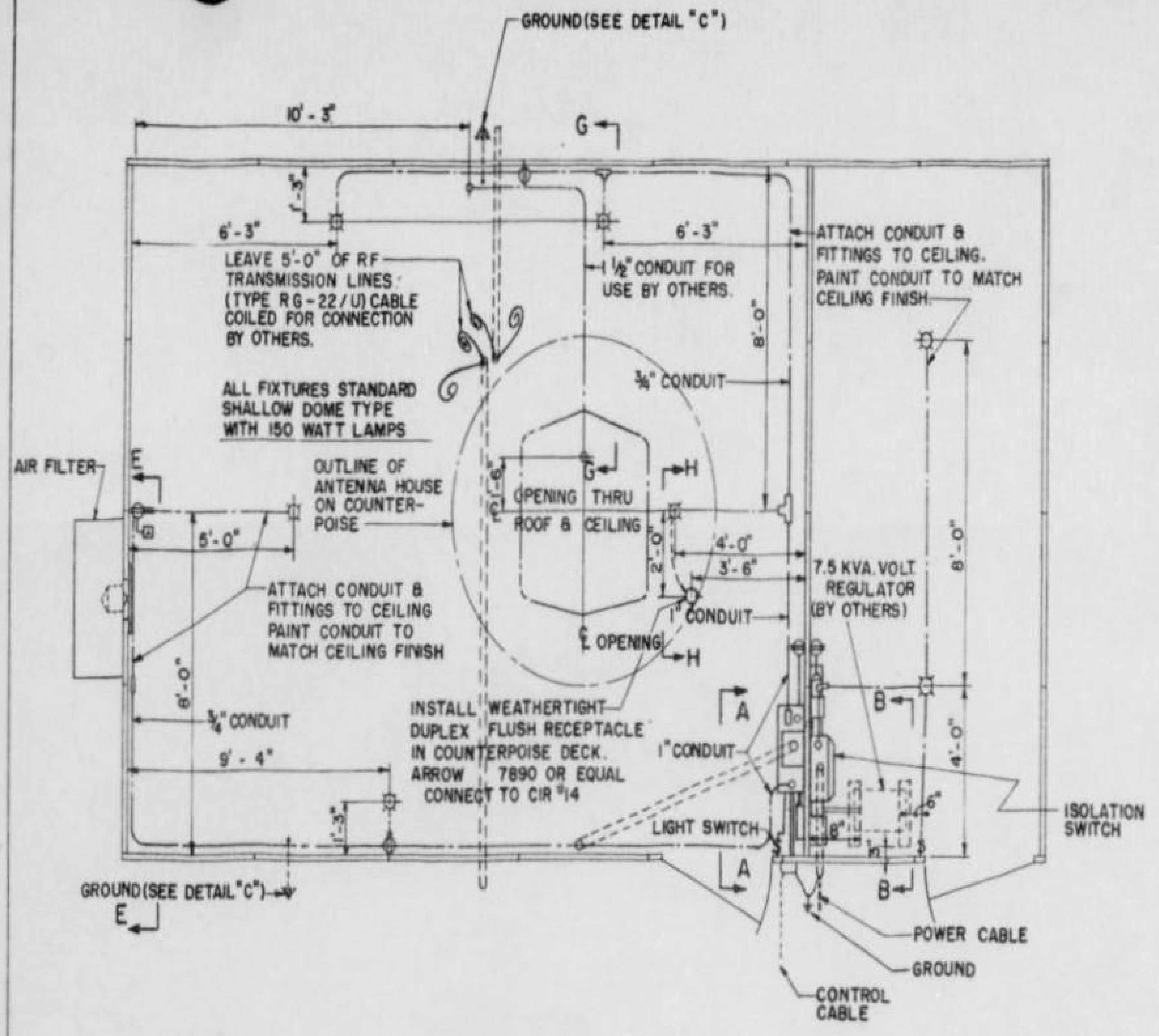
APPROVED H.W. HOWARD
CHIEF AIRWAYS ENGINEERING DIVISION

SUBMITTED BY:
CHIEF OF SECTION

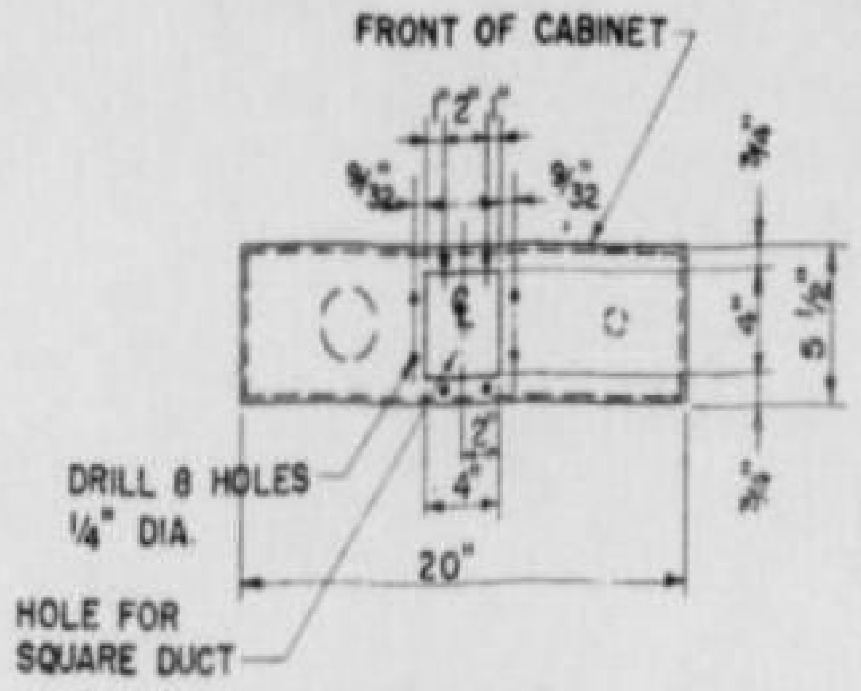
CHECKED BY

DRAWN BY J.F.F.
DATE 7-31-43

DR. C-2106-2


GROUND (SEE DETAIL "C")
10'-3"
G
6'-3"
6'-3"
LEAVE 5'-0" OF RF TRANSMISSION LINES (TYPE RG-22/U) CABLE COILED FOR CONNECTION BY OTHERS.
1½" CONDUIT FOR USE BY OTHERS.
ATTACH CONDUIT & FITTINGS TO CEILING. PAINT CONDUIT TO MATCH CEILING FINISH.
8'-0"
ALL FIXTURES STANDARD SHALLOW DOME TYPE WITH 150 WATT LAMPS
¾" CONDUIT
AIR FILTER
E
OUTLINE OF ANTENNA HOUSE ON COUNTERPOISE
OPENING THRU ROOF & CEILING
H
5'-0"
4'-0"
3'-6"
7.5 KVA. VOLT. REGULATOR (BY OTHERS)
8'-0"
ATTACH CONDUIT & FITTINGS TO CEILING PAINT CONDUIT TO MATCH CEILING FINISH
1" CONDUIT
℄ OPENING
H
8'-0"
¾" CONDUIT
INSTALL WEATHERTIGHT DUPLEX FLUSH RECEPTACLE IN COUNTERPOISE DECK. ARROW 7890 OR EQUAL CONNECT TO CIR #14
A
1" CONDUIT
B
4'-0"
9'-4"
1'-3"
LIGHT SWITCH
6"
8"
ISOLATION SWITCH
A
B
GROUND (SEE DETAIL "C")
E
POWER CABLE
GROUND
CONTROL CABLE

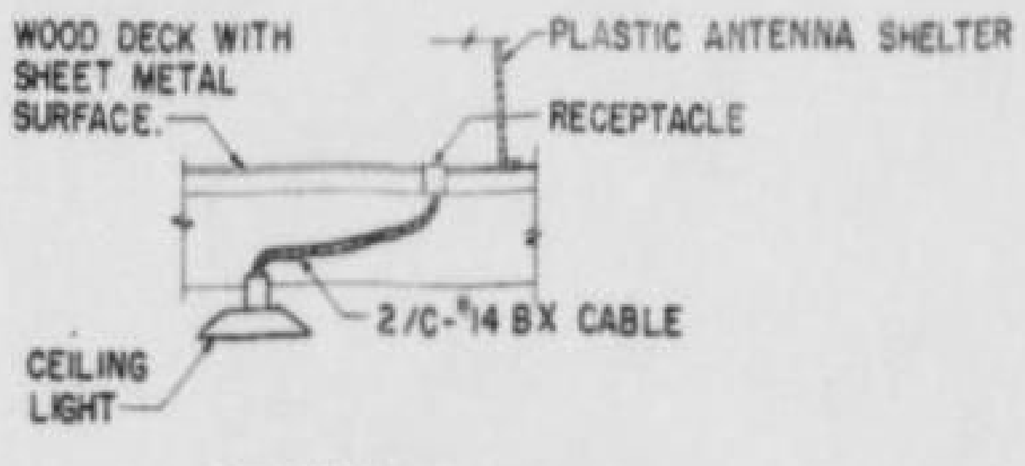
WIRING PLAN



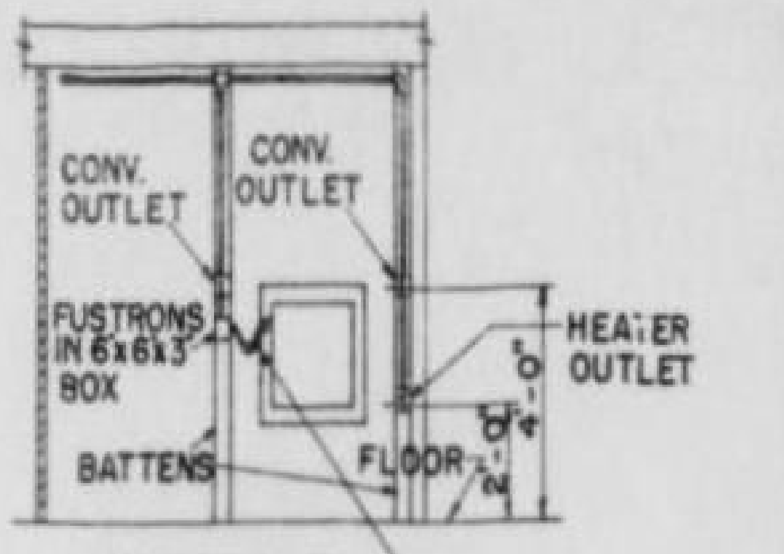
VIEW C-C

NOTES:

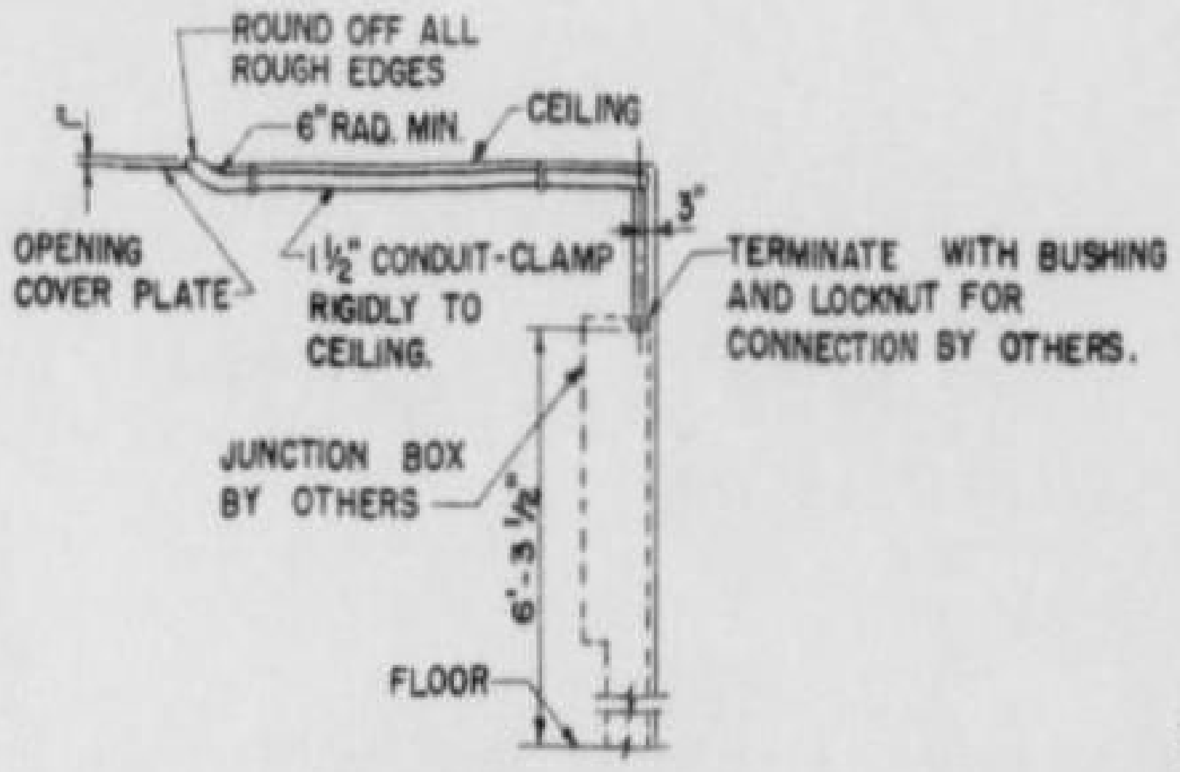
1. SET SPACE HEATER ON FLOOR AND PLUG FLEXIBLE CORD INTO OUTLET.
2. ALL CONDUITS AND FITTINGS TO BE GALVANIZED. CONDUIT SIZES SHOWN ARE MINIMUM. ONE SIZE LARGER MAY BE SUBSTITUTED IF DESIRED
3. GROUND ONE SIDE OF ALL 120V. BRANCH CIRCUITS.
4. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
5. ALL CONDUITS ½" UNLESS OTHERWISE NOTED.
6. SEE DRAWING D-1702-488 FOR WIRING DIAGRAM.



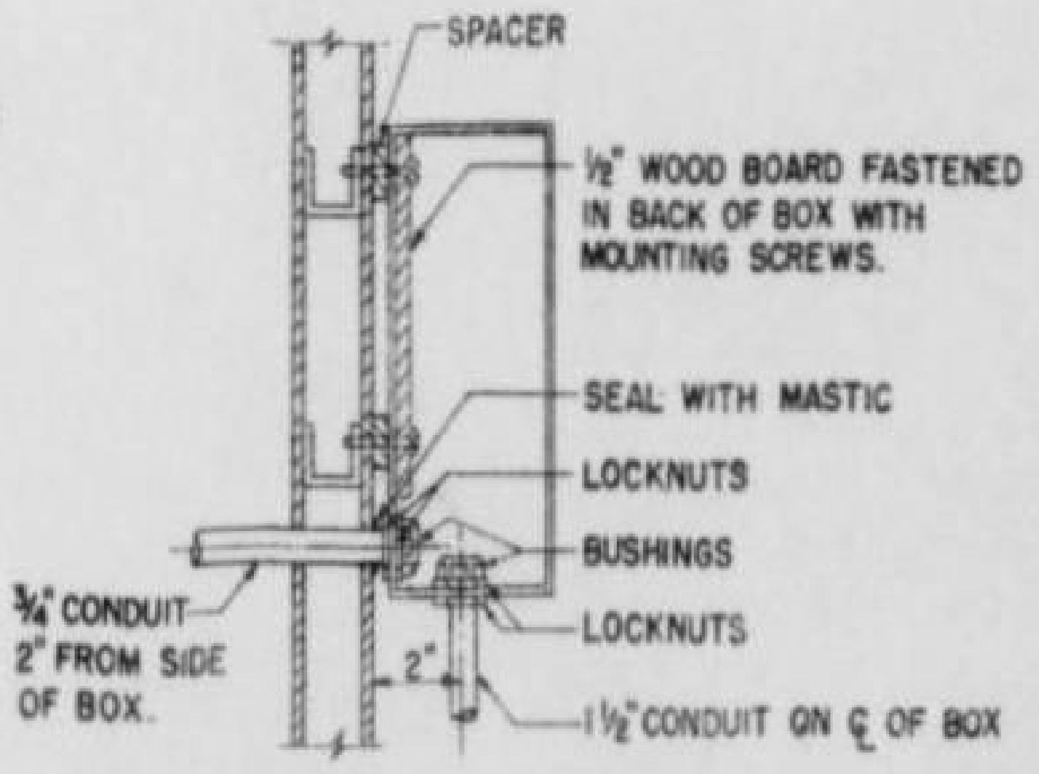
SECTION H-H



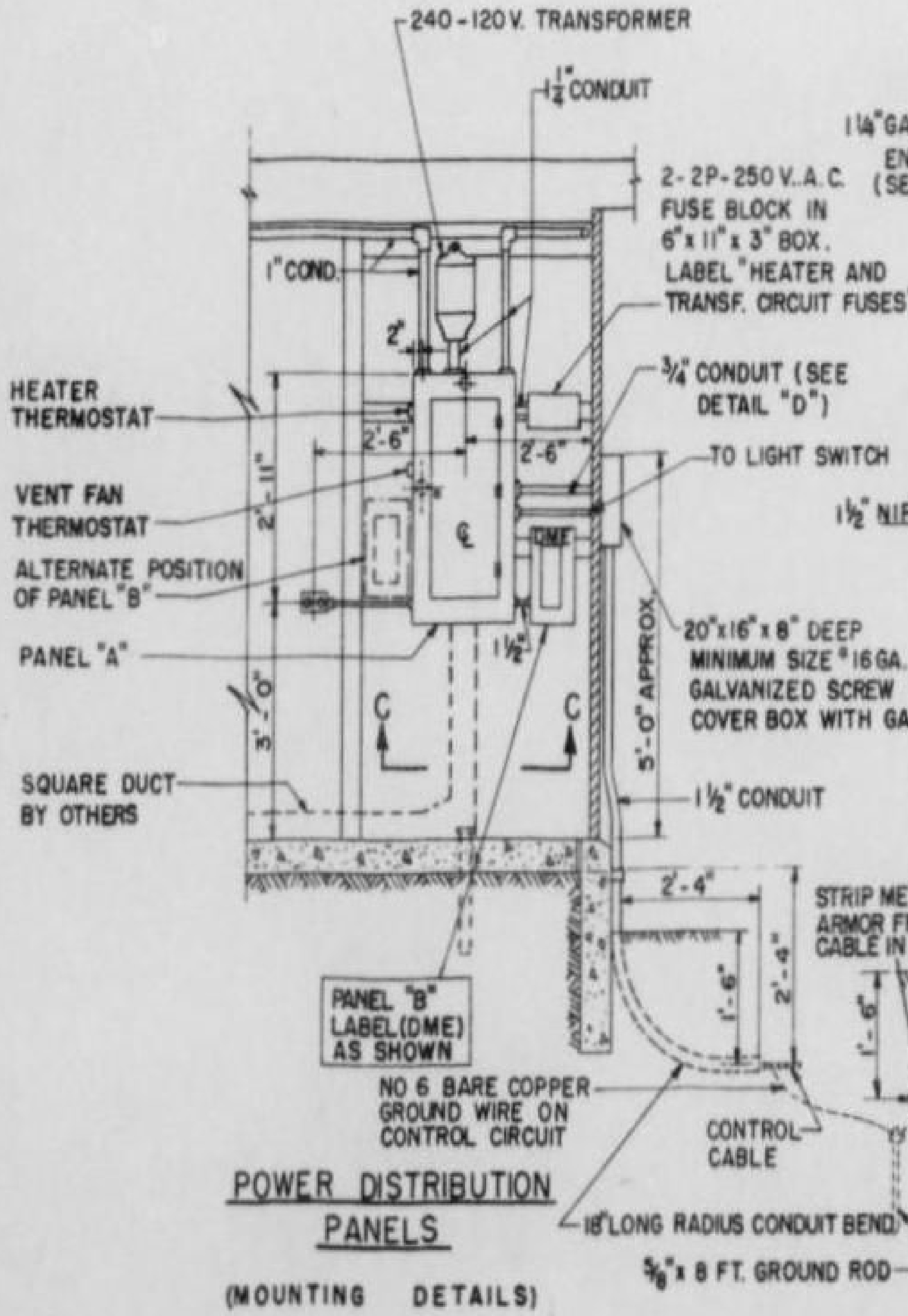
SECTION E-E


ROUND OFF ALL ROUGH EDGES
6" RAD. MIN.
CEILING
OPENING COVER PLATE
1½" CONDUIT-CLAMP RIGIDLY TO CEILING.
3"
TERMINATE WITH BUSHING AND LOCKNUT FOR CONNECTION BY OTHERS.
JUNCTION BOX BY OTHERS
6'-3½"
FLOOR

SECTION G-G


SPACER
½" WOOD BOARD FASTENED IN BACK OF BOX WITH MOUNTING SCREWS.
SEAL WITH MASTIC
LOCKNUTS
BUSHINGS
LOCKNUTS
¾" CONDUIT 2" FROM SIDE OF BOX.
2"
1½" CONDUIT ON ℄ OF BOX

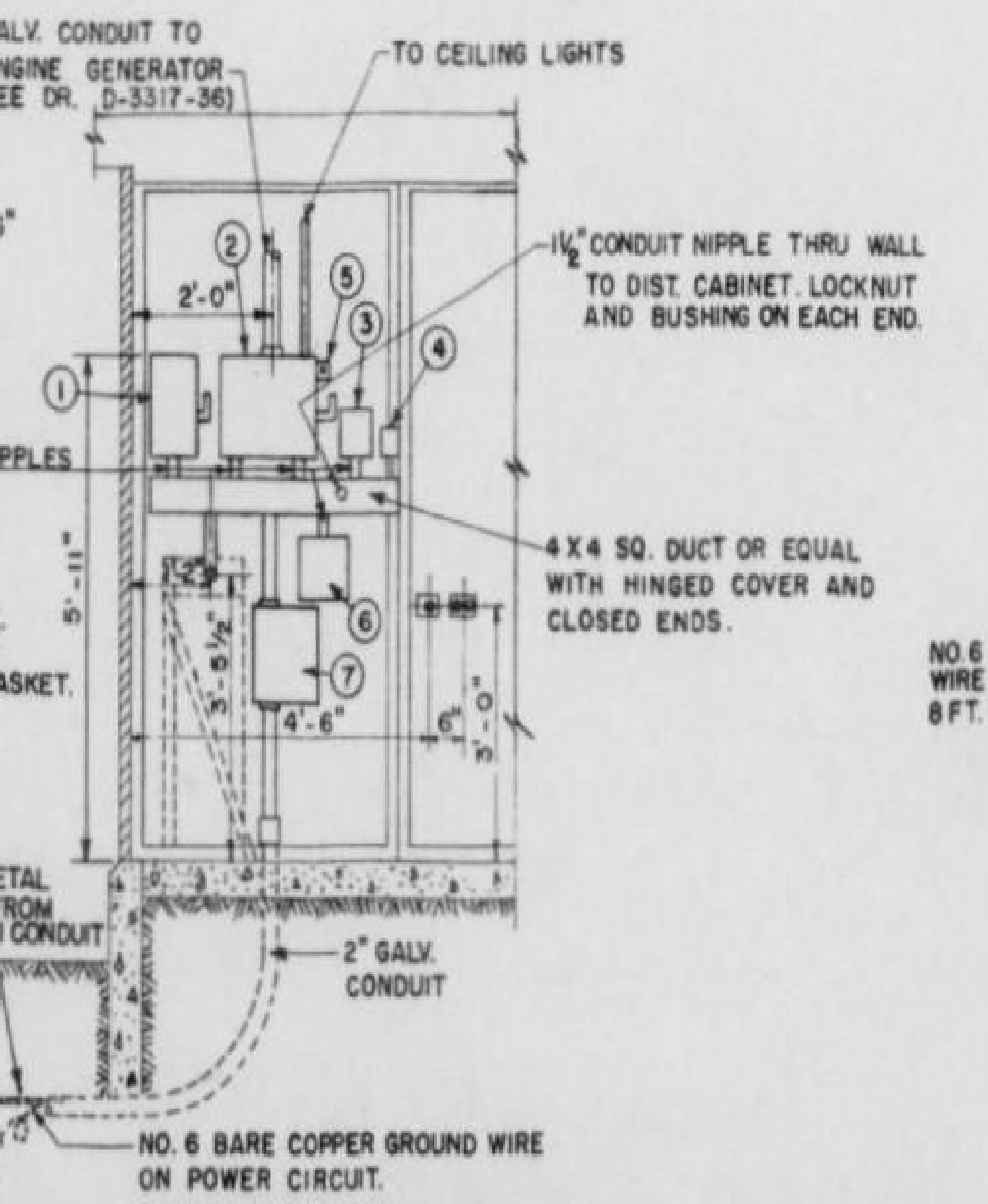
DETAIL "D"


240-120 V. TRANSFORMER
1½" CONDUIT
2-2P-250 V.A.C. FUSE BLOCK IN 6"x11"x3" BOX. LABEL "HEATER AND TRANSF. CIRCUIT FUSES"
1" COND.
2"
HEATER THERMOSTAT
¾" CONDUIT (SEE DETAIL "D")
2'-6"
2'-6"
TO LIGHT SWITCH
VENT FAN THERMOSTAT
2'-11"
ALTERNATE POSITION OF PANEL "B"
DME
PANEL "A"
1½"
20"x16"x8" DEEP MINIMUM SIZE #16 GA. GALVANIZED SCREW COVER BOX WITH GASKET.
C
C
3'-0"
5'-0" APPROX.
SQUARE DUCT BY OTHERS
1½" CONDUIT
2'-4"
2'-4"
1'-6"
PANEL "B" LABEL (DME) AS SHOWN
NO 6 BARE COPPER GROUND WIRE ON CONTROL CIRCUIT
CONTROL CABLE
18" LONG RADIUS CONDUIT BEND
⅝" x 8 FT. GROUND ROD

POWER DISTRIBUTION PANELS

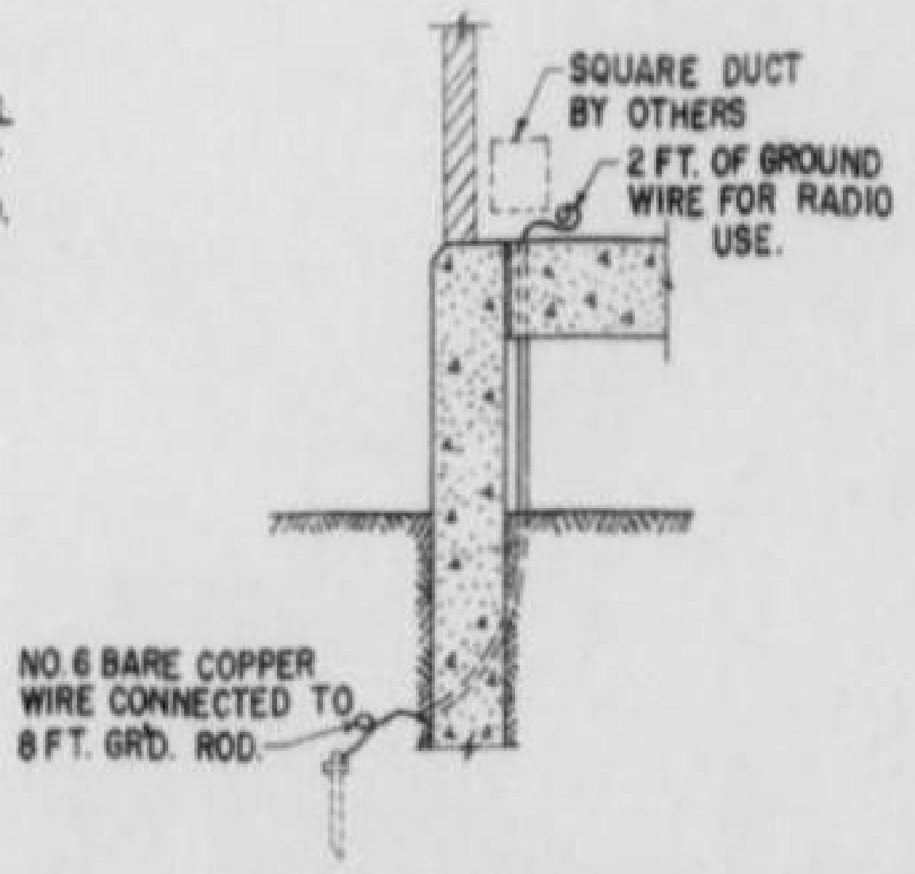
(MOUNTING DETAILS)

VIEW A-A


1¼" GALV. CONDUIT TO ENGINE GENERATOR (SEE DR. D-3317-36)
TO CEILING LIGHTS
1½" CONDUIT NIPPLE THRU WALL TO DIST. CABINET. LOCKNUT AND BUSHING ON EACH END.
2'-0"
1
2
3
4
5
6
7
1½" NIPPLES
4 X 4 SQ. DUCT OR EQUAL WITH HINGED COVER AND CLOSED ENDS.
5'-11"
3'-3½"
4'-6"
6"
5'-0"
STRIP METAL ARMOR FROM CABLE IN CONDUIT
1'-6"
2" GALV. CONDUIT
NO. 6 BARE COPPER GROUND WIRE ON POWER CIRCUIT.

POWER ENTRANCE DETAIL

VIEW B-B


SQUARE DUCT BY OTHERS
2 FT. OF GROUND WIRE FOR RADIO USE.
NO.6 BARE COPPER WIRE CONNECTED TO 8 FT. GRD. ROD.

CONDUIT GROUND DETAIL

DETAIL "C"

EQUIPMENT AT POWER ENTRANCE

① ENTRANCE SWITCH-60A. 2P. FUSED.

② 4PDT 60 AMP. ISOLATION SWITCH

③ DME POWER RELAY STRUTHERS-DUNN #84-8XB IN H11 BOX OR EQUAL

④ DME AUXILIARY RELAY S.D. #1XXA OR EQUAL WITH H-6 SHEET METAL HOUSING.

⑤ INDICATING LIGHT

⑥ 1-2P-250 V. FUSE BLOCKS IN 9"X9"X4" CABINET MARK "REGULATOR FUSES"

⑦ 12"x16"x6" PULL BOX FOR SPLICING INCOMING CABLE TO NO.6 WIRE

LEGEND		
PLAN	ELEV.	DESCRIPTION
⊕	⊡	DOUBLE CONVENIENCE OUTLET
☐		CEILING LAMP RECEPTACLE
$	▯	SINGLE LIGHT SWITCH
┏	▭	ELL FITTING
┳	┳	TEE FITTING
⊠	⊠	POLARIZED OUTLET (HEATER)
T	☐	THERMOSTAT
---		SURFACE MOUNTED CONDUIT

NO.	REVISION	DATE	CHECKED
7	ADDED ITEM ⑦	12-5-52	
6	CHANGED ITEM ④	3-3-52	
5	ADDED SQ. DUCT AT POWER ENTRANCE	11-26-51	
4	REVISED EQUIPMENT LAYOUT IN VIEW B-B	7-13-51	
3	WIRING DIAGRAM DELETED & OTHER CHANGES	3-6-51	
2	AIR FILTER RELOCATED	7-17-50	
1	ADDED DME POWER PANEL	6-5-50	

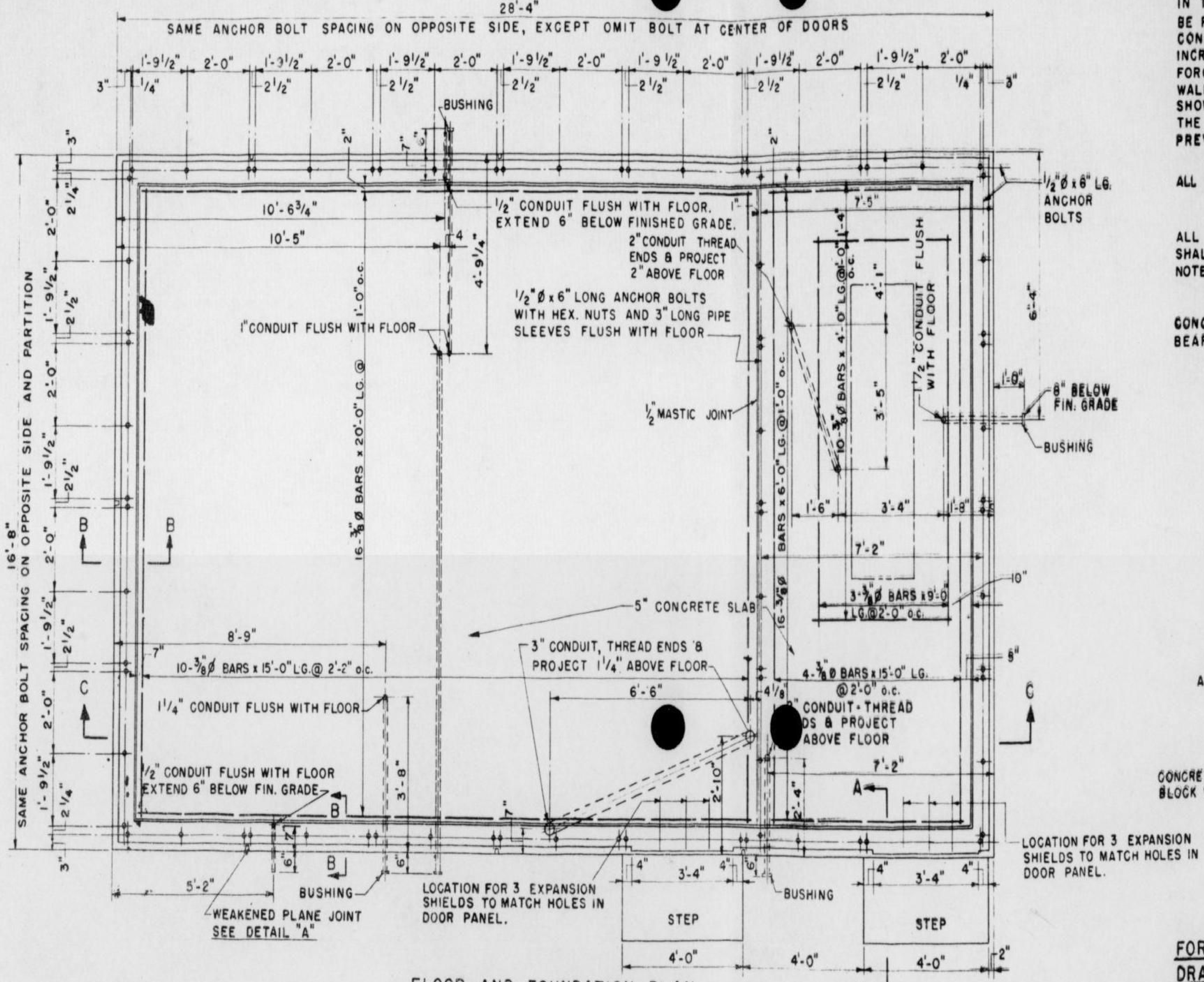
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VOR / DME
16'x28' TYPE "S" BLDG. WITH COUNTERPOISE ROOF
ELECTRICAL LAYOUT

APPROVED: H.O. Shaw
R. J. ALPHER
CHIEF STRUC. & LIGHT ESTAB. BRANCH
SUBMITTED BY: Frank H Cozgrove
CHIEF OF SECTION
CHECKED:
DESIGNED:
DRAWN: J.F.F.
TRACED: A.B.T.
DATE: 3-31-50
DR. D-1702-48A

Revised DWNG. dated 7-24-53
Requested fm IR200

ESTIMATED QUANTITIES (OFFICE USE ONLY)	
CONCRETE	9 CU. YDS.
8" CONCRETE BLOCK	132 SQ. FT.


28'-4"
SAME ANCHOR BOLT SPACING ON OPPOSITE SIDE, EXCEPT OMIT BOLT AT CENTER OF DOORS
1'-9 1/2"
2'-0"
1'-3 1/2"
2 1/2"
1/4"
3"
BUSHING
1/2" CONDUIT FLUSH WITH FLOOR. EXTEND 6" BELOW FINISHED GRADE.
10'-6 3/4"
10'-5"
4'-9 1/4"
2" CONDUIT THREAD ENDS & PROJECT 2" ABOVE FLOOR
1/2"Ø x 6" LONG ANCHOR BOLTS WITH HEX. NUTS AND 3" LONG PIPE SLEEVES FLUSH WITH FLOOR
1" CONDUIT FLUSH WITH FLOOR
16-3/8Ø BARS x 20'-0" LG. @ 1'-0" o.c.
1/2" MASTIC JOINT
1/2"Ø x 6" LG. ANCHOR BOLTS
7'-5"
10-3/8Ø BARS x 4'-0" LG. @ 1'-0" o.c.
1 1/2" CONDUIT FLUSH WITH FLOOR
3'-5"
6'-4"
1'-0"
8" BELOW FIN. GRADE
BUSHING
1'-6"
3'-4"
1'-8"
7'-2"
16-3/8Ø BARS x 6'-0" LG. @ 1'-0" o.c.
3-3/8Ø BARS x 9'-0" LG. @ 2'-0" o.c.
10"
5" CONCRETE SLAB
SAME ANCHOR BOLT SPACING ON OPPOSITE SIDE AND PARTITION
16'-8"
B
C
8'-9"
7"
10-3/8Ø BARS x 15'-0" LG. @ 2'-2" o.c.
3" CONDUIT, THREAD ENDS & PROJECT 1 1/4" ABOVE FLOOR
4-3/8Ø BARS x 15'-0" LG. @ 2'-0" o.c.
1 1/4" CONDUIT FLUSH WITH FLOOR
6'-6"
2" CONDUIT-THREAD ENDS & PROJECT ABOVE FLOOR
3'-8"
2'-10"
1/2" CONDUIT FLUSH WITH FLOOR EXTEND 6" BELOW FIN. GRADE
2'-4"
A
5'-2"
WEAKENED PLANE JOINT SEE DETAIL "A"
BUSHING
LOCATION FOR 3 EXPANSION SHIELDS TO MATCH HOLES IN DOOR PANEL.
BUSHING
LOCATION FOR 3 EXPANSION SHIELDS TO MATCH HOLES IN DOOR PANEL.
4"
3'-4"
STEP
STEP
4'-0"
2"

FLOOR AND FOUNDATION PLAN

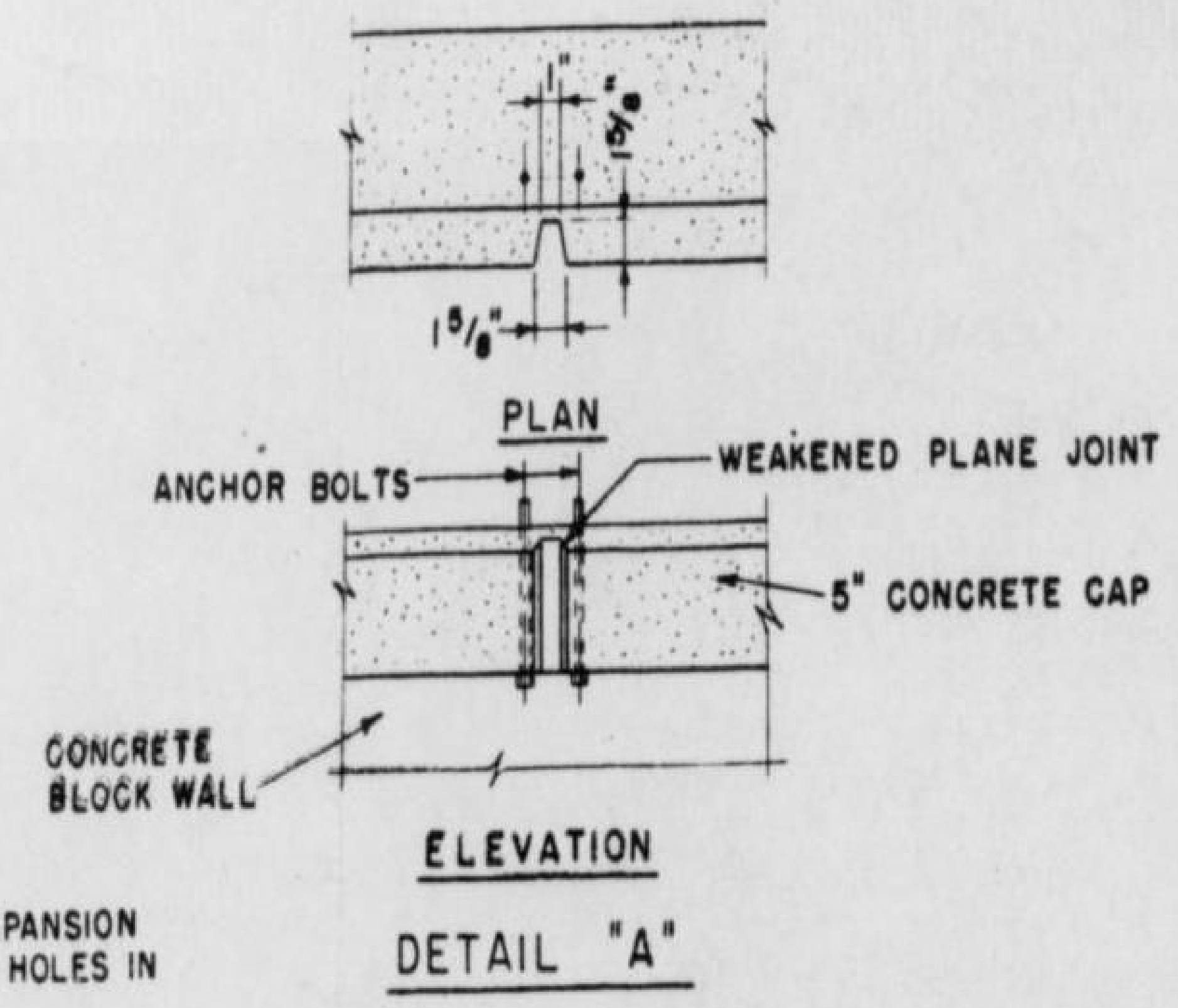
NOTES:

6" SOLID CONCRETE WALLS MAY BE USED IN LIEU OF CONCRETE BLOCKS. UNLESS OTHERWISE SPECIFIED IN THE PROPOSAL, THE SOLID CONCRETE WALL SHALL BE PLACED ON A FOOTING OF SIZE AS SHOWN FOR CONCRETE BLOCKS. THE WALL THICKNESS SHALL BE INCREASED TO 8" IF NO FOOTING IS USED. NO REINFORCING STEEL SHALL BE USED IN THE SOLID CONCRETE WALL, BUT WEAKENED PLANE JOINTS AS AND WHERE SHOWN FOR THE CONCRETE CAP SHALL BE CARRIED DOWN THE FULL DEPTH OF THE SOLID CONCRETE WALL TO PREVENT UNSIGHTLY CRACKS.

ALL CONDUITS TO HAVE STANDARD RADIUS BENDS.

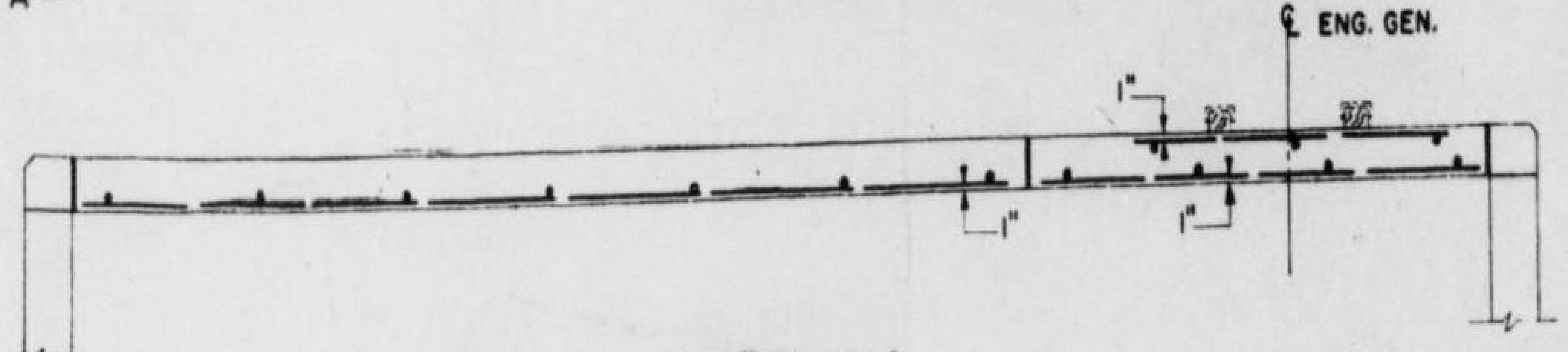
ALL CONDUITS EXTENDING OUTSIDE FOUNDATION WALL SHALL BE 1'-6" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED

CONCRETE BLOCK SHALL MEET REQUIREMENTS FOR LOAD BEARING UNITS CALLED FOR IN FEDERAL SPECIF'N SS-C-621.

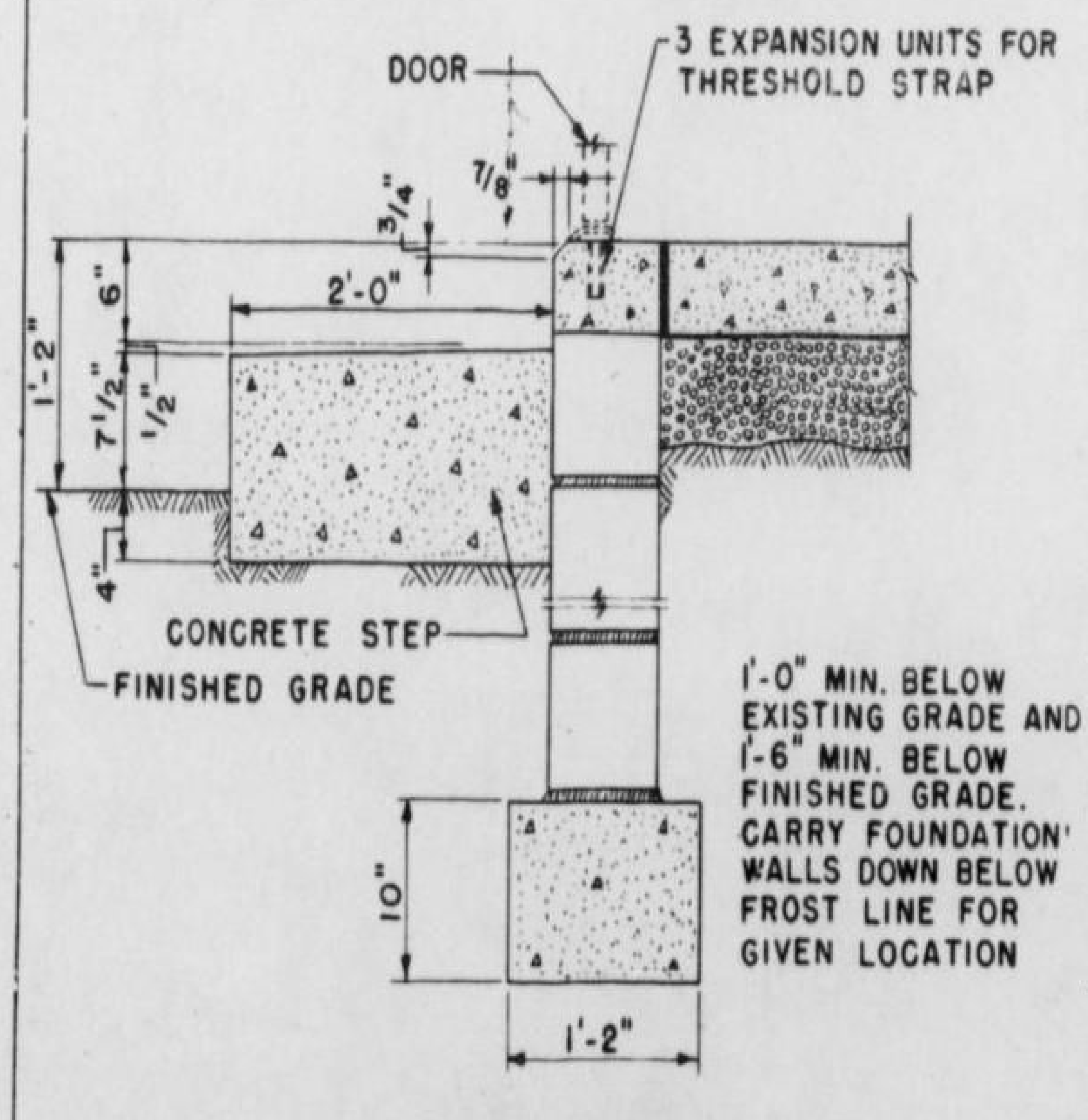


DETAIL "A"

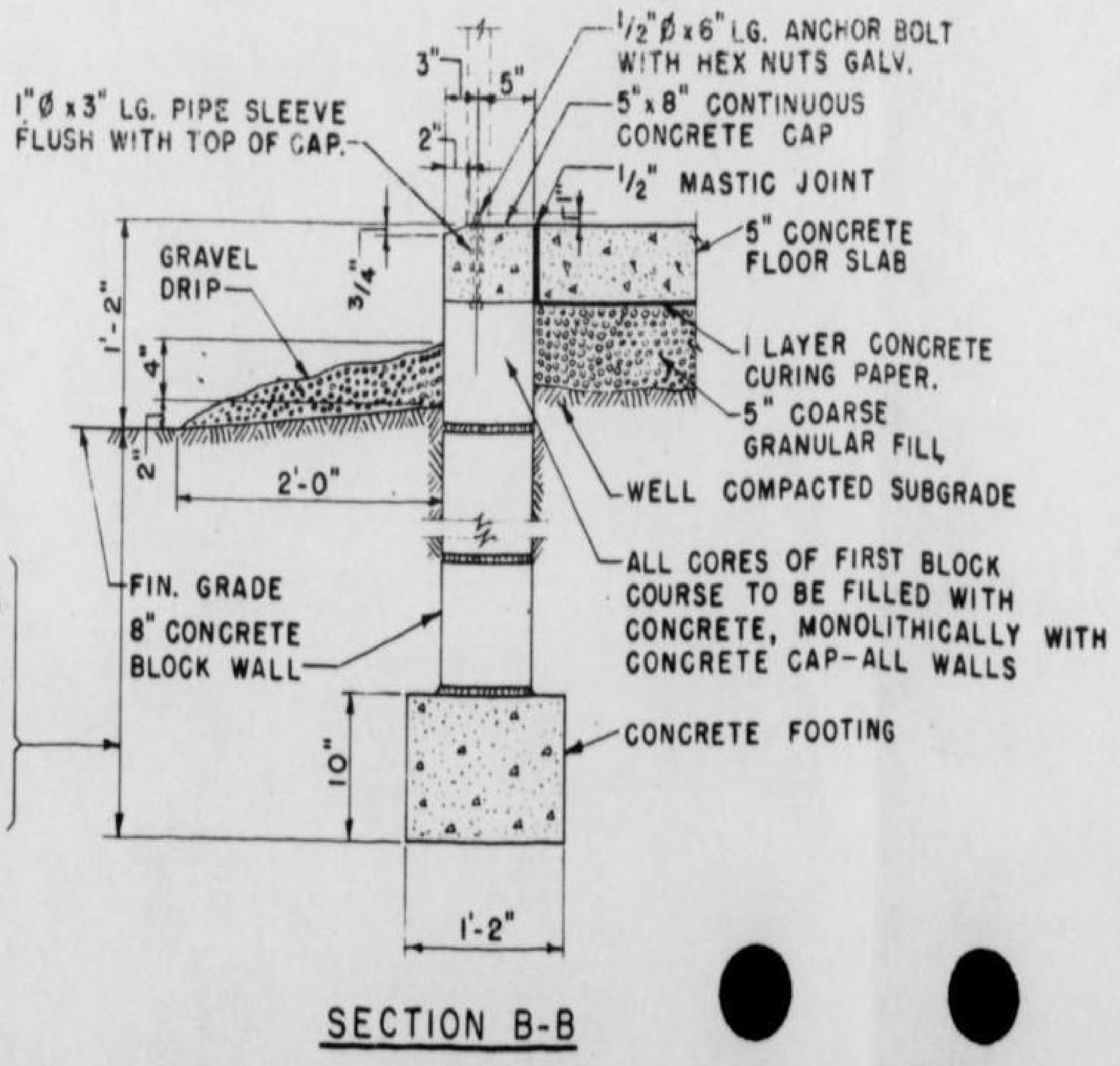
FOR TYPICAL PLOT PLAN AND REFERENCE DRAWINGS SEE DRAWING D-2798-5



SECTION C-C


DOOR
3 EXPANSION UNITS FOR THRESHOLD STRAP
7/8"
3/4"
2'-0"
1'-2"
6"
7 1/2"
1/2"
4"
CONCRETE STEP
FINISHED GRADE
1'-0" MIN. BELOW EXISTING GRADE AND 1'-6" MIN. BELOW FINISHED GRADE. CARRY FOUNDATION WALLS DOWN BELOW FROST LINE FOR GIVEN LOCATION
10"
1'-2"

SECTION A-A


1/2"Ø x 6" LG. ANCHOR BOLT WITH HEX NUTS GALV.
3"
5"
1"Ø x 3" LG. PIPE SLEEVE FLUSH WITH TOP OF CAP.
5" x 8" CONTINUOUS CONCRETE CAP
2"
1/2" MASTIC JOINT
GRAVEL DRIP
5" CONCRETE FLOOR SLAB
1'-2"
3/4"
1 LAYER CONCRETE CURING PAPER.
4"
5" COARSE GRANULAR FILL
2"
2'-0"
WELL COMPACTED SUBGRADE
FIN. GRADE
ALL CORES OF FIRST BLOCK COURSE TO BE FILLED WITH CONCRETE, MONOLITHICALLY WITH CONCRETE CAP-ALL WALLS
8" CONCRETE BLOCK WALL
CONCRETE FOOTING
10"
1'-2"

SECTION B-B

12	GROUND SUPPORTED FLOOR - REDRAWN	7-12-51	[illegible]	
NO.	REVISION	DATE	CHECKED	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

V.H.F.
16'x28' TYPE "S" RANGE BUILDING
FOUNDATION PLAN

APPROVED: for R. J. ALPHER
CHIEF STRUC. & LTG. ESTAB. BRANCH

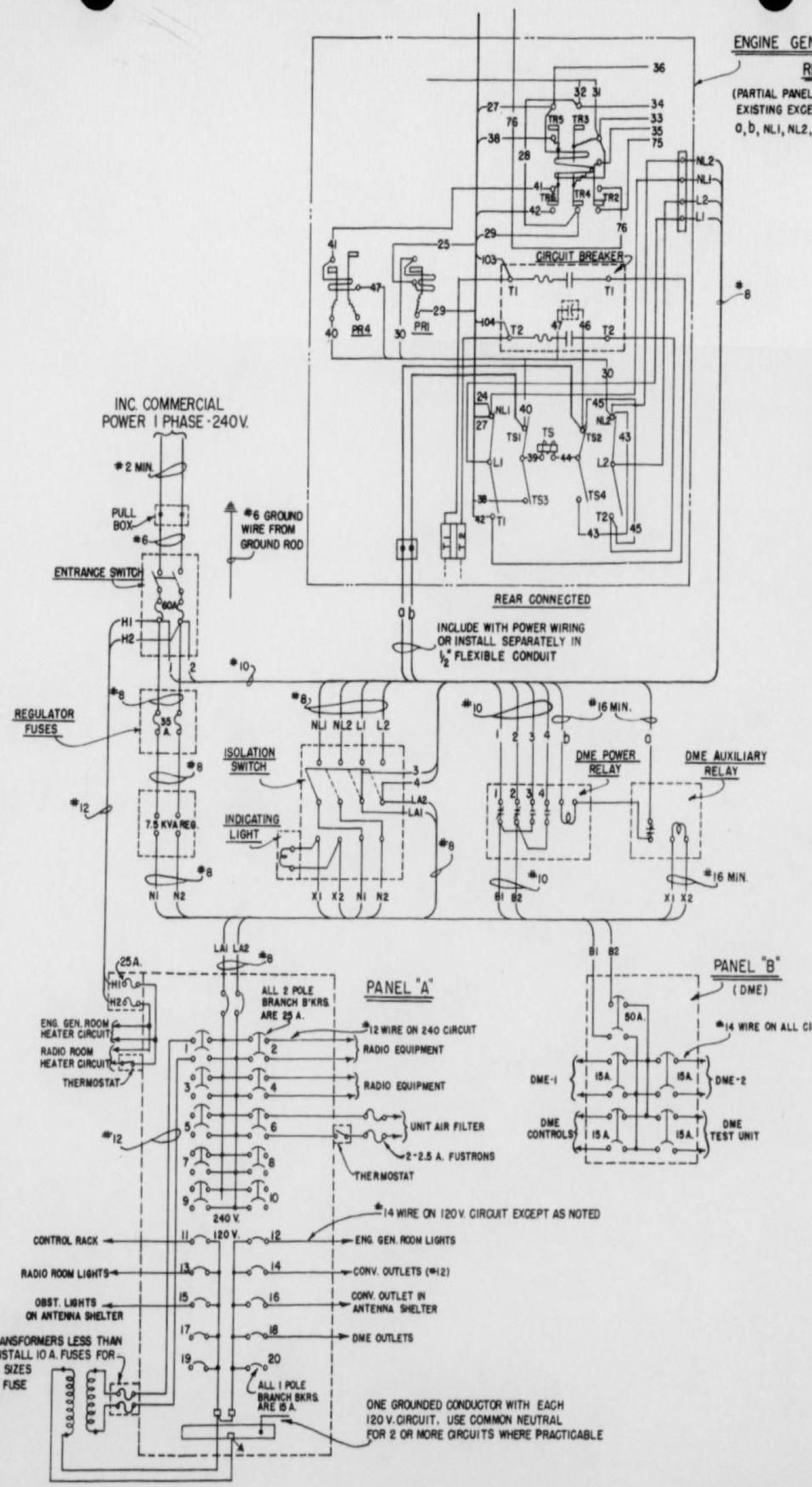
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION

CHECKED	DESIGNED	DRAWN: A.B.T.	DR. D-1703-2C
	TRACED: D.T.	DATE: 9-8-44	

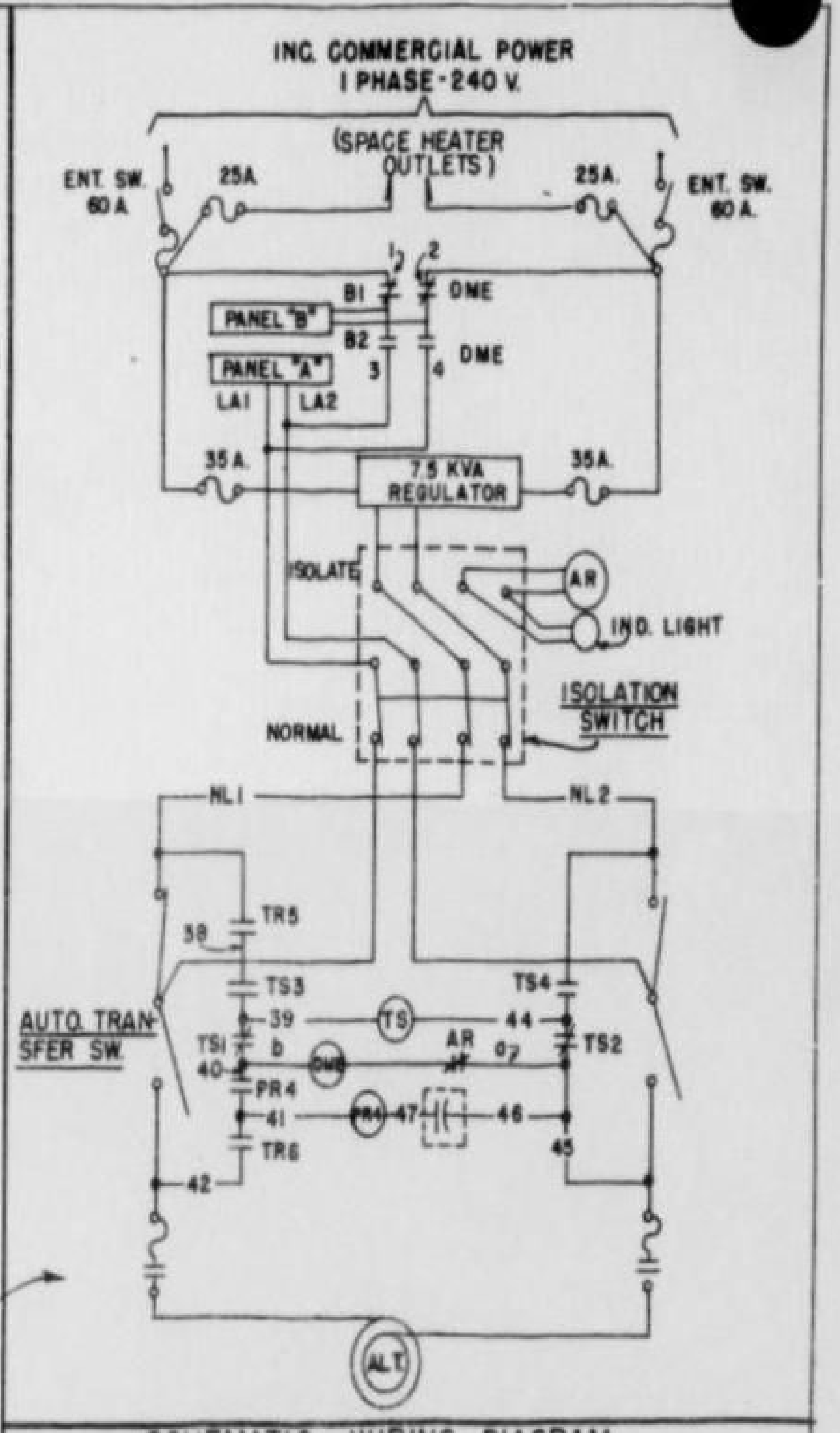
53324

Foundation Plan

8/7/53 Revised - ordered


ENGINE GENERATOR SWITCHBOARD
REAR VIEW
(PARTIAL PANEL WIRING ONLY. ALL WIRING EXISTING EXCEPT FOR INTERCONNECTIONS O, b, NL1, NL2, L1, L2.)
CIRCUIT BREAKER
TR5
TR3
TR6
TR4
TR2
PR4
PR1
TS
TS1
TS2
TS3
TS4
NL1
NL2
L1
L2
T1
T2
#8
REAR CONNECTED
INCLUDE WITH POWER WIRING OR INSTALL SEPARATELY IN 1/2" FLEXIBLE CONDUIT
INC. COMMERCIAL POWER 1 PHASE-240V.
#2 MIN.
PULL BOX
#6
#6 GROUND WIRE FROM GROUND ROD
ENTRANCE SWITCH
60A
H1
H2
#10
REGULATOR FUSES
35 A.
#8
#12
7.5 KVA REG.
N1 N2
ISOLATION SWITCH
INDICATING LIGHT
X1 X2 N1 N2
LA2
LA1
#10
#16 MIN.
DME POWER RELAY
DME AUXILIARY RELAY
B1 B2
X1 X2
#16 MIN.
LA1 LA2
25A.
PANEL "A"
ALL 2 POLE BRANCH B'KRS. ARE 25 A.
#12 WIRE ON 240 CIRCUIT
ENG. GEN. ROOM HEATER CIRCUIT
RADIO ROOM HEATER CIRCUIT
THERMOSTAT
RADIO EQUIPMENT
RADIO EQUIPMENT
UNIT AIR FILTER
2-2.5 A. FUSTRONS
THERMOSTAT
240 V.
120 V.
#14 WIRE ON 120V. CIRCUIT EXCEPT AS NOTED
CONTROL RACK
ENG. GEN. ROOM LIGHTS
RADIO ROOM LIGHTS
CONV. OUTLETS (#12)
OBST. LIGHTS ON ANTENNA SHELTER
CONV. OUTLET IN ANTENNA SHELTER
DME OUTLETS
FOR TRANSFORMERS LESS THAN 2 KVA INSTALL 10 A. FUSES FOR LARGER SIZES DELETE FUSE BLOCK
ALL 1 POLE BRANCH BKRS. ARE 15 A.
ONE GROUNDED CONDUCTOR WITH EACH 120V. CIRCUIT. USE COMMON NEUTRAL FOR 2 OR MORE CIRCUITS WHERE PRACTICABLE
PANEL "B" (DME)
50A.
#14 WIRE ON ALL CIRCUITS
DME-1
DME-2
15A.
DME CONTROLS
DME TEST UNIT

SYMBOLS	
TS	TRANSFER SWITCH
PR1	POTENTIAL RELAY - NORMAL
PR4	POTENTIAL RELAY - EMERGENCY
DME	DME POWER RELAY
TR	TRANSFER RELAY
AR	DME AUXILIARY RELAY



FOR COMPLETE ENG. GEN. SCHEMATIC SEE APPLICABLE MANUFACTURERS DRAWING

SCHEMATIC WIRING DIAGRAM

NOTES

1. THE ENGINE GENERATOR DIAGRAM APPLIES ONLY TO THE 1φ-240V. 8KVA AUTOMATIC ENGINE GENERATOR MANUFACTURED BY: THE DUPLEX TRUCK CO.
2. ALL RELAYS ARE SHOWN DE-ENERGIZED.
3. SEE DR'WG. D-1702-48A FOR THE COMPLETE ELECTRICAL LAYOUT.
4. ALL WIRE SIZES SHOWN ARE AWG 600 V. INSULATED. WIRE SIZES IN ALL CASES SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
5. HEATER CIRCUITS ARE UNREGULATED, CONNECT DIRECTLY TO INCOMING COMMERCIAL POWER, AS SHOWN. HEATER FRAME TO BE GROUNDED.
6. GROUND ALL NON-CURRENT CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT WITH # 6 BARE WIRE.
7. RUN #6 BARE WIRE TO ENG. GEN. ALONG WITH WIRING FOR GROUNDING.

DESCRIPTION OF DME RELAY OPERATIONS

DME POWER RELAY - THIS RELAY FUNCTIONS AS FOLLOWS:

(1) BY-PASSES MAIN REGULATOR CAUSING DME TO DRAW LOAD DIRECTLY FROM COMMERCIAL POWER WHEN POWER CONDITIONS ARE NORMAL; CONTACTS 1 & 2 CLOSED, 3 & 4 OPEN.

(2) CHANGES DME LOAD TO THE ENG. GEN. IN EVENT OF COMMERCIAL POWER FAILURE; CONTACTS 1 & 2 OPEN, 3 & 4 CLOSED. RETURNS LOAD TO NORMAL POWER WHEN COMMERCIAL POWER IS RESTORED. THE RELAY COIL IS INTERLOCKED WITH THE ENG. GEN. AS SHOWN SO THAT ITS OPERATION PARALLELS THAT OF THE TRANSFER SWITCH

AR RELAY - THIS RELAY PREVENTS CHANGING DME LOAD TO THE REGULATED COMMERCIAL POWER SUPPLY WHEN ISOLATION SWITCH IS PLACED IN ISOLATE POSITION AND ENG. GEN. IS TEST RUN.

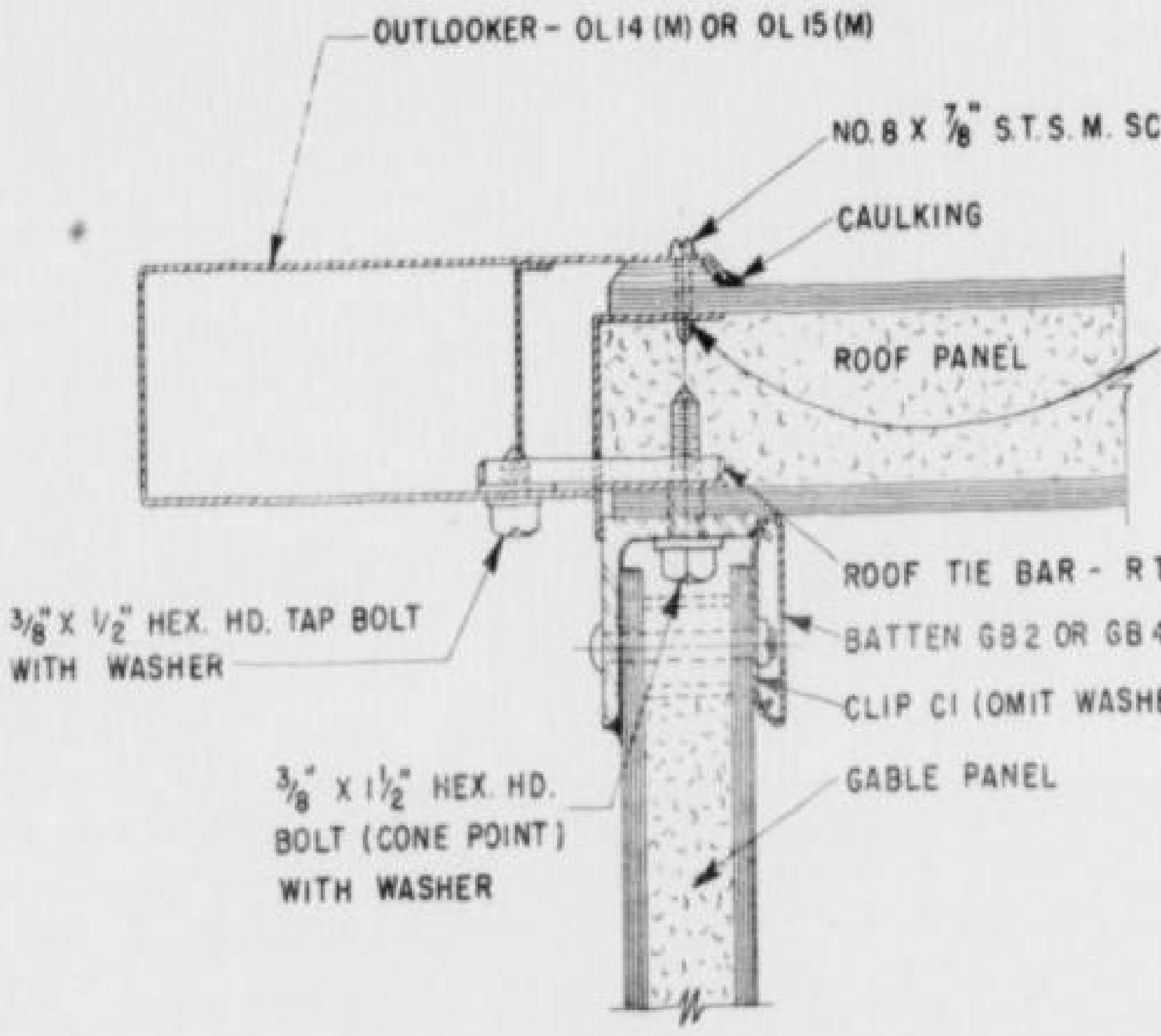
NO.	REVISION	DATE	CHECKED
4.	ADDED PULL BOX	12-5-52	
3.	REVISED WIRE SIZES	8-13-52	CAH
2.	CHANGED WIRE SIZES	3-10-52	
1.	ADDED DME OUTLETS TO PANELS "A" & "B"	6-6-51	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

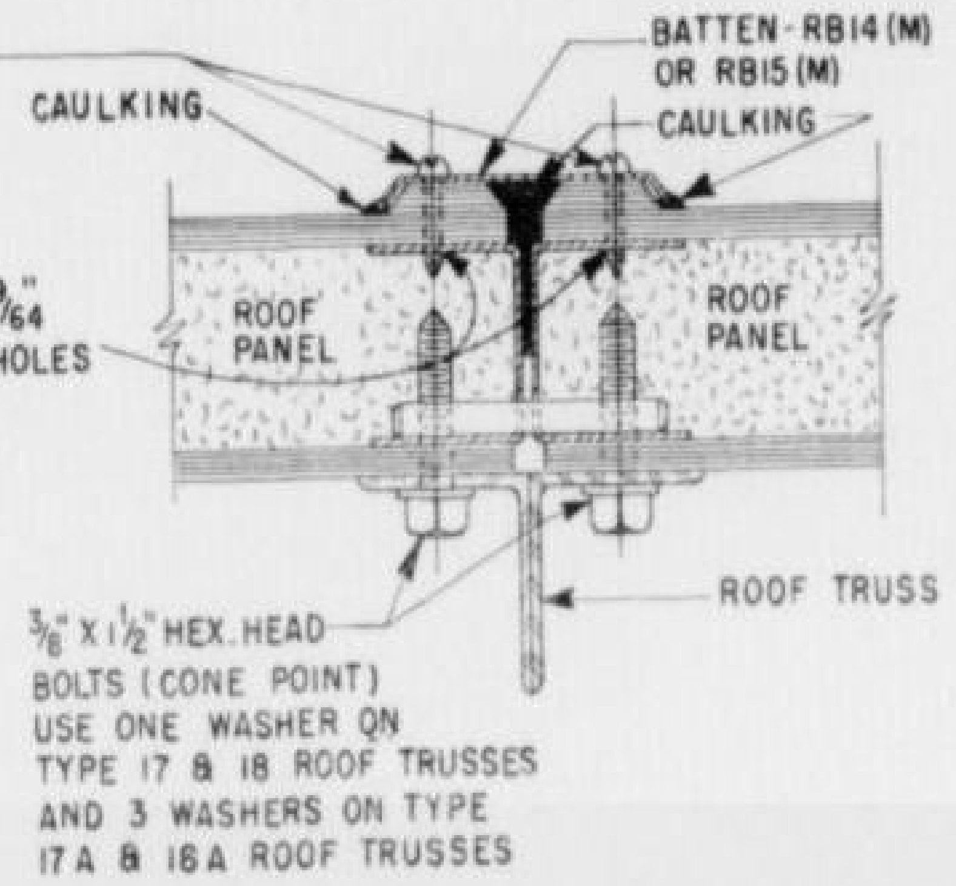
VOR/DME
POWER WIRING DIAGRAM

APPROVED: for R.Lacmer
CHIEF: STRUCTURES AND L.TG. ESTAB. BR.
SUBMITTED BY: Frank H. Cosgrove
CHIEF: DESIGN AND TECH. BRANCH
CHECKED
DESIGNED: V.J.G.
DRAWN: V.J.P.
TRACED: D.G.C.
DATE: 3-6-51
DR. D-1702-48 B

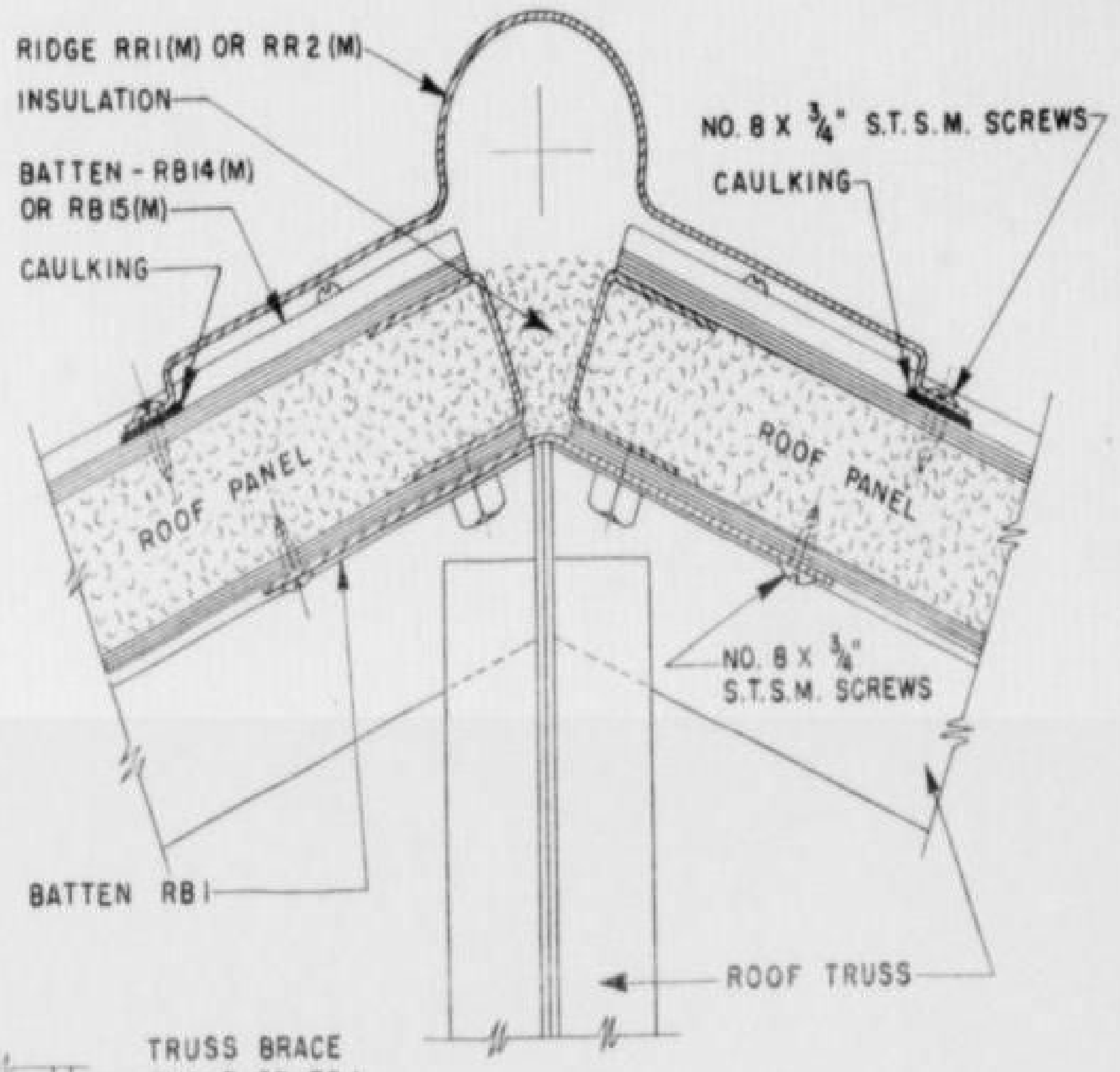
8/7/53 Revised - Ordered


OUTLOOKER - OL14 (M) OR OL15 (M)
NO. 8 X 7/8" S.T.S.M. SCREWS
CAULKING
ROOF PANEL
DRILL 9/64" PILOT HOLES
3/8" X 1/2" HEX. HD. TAP BOLT WITH WASHER
ROOF TIE BAR - RTB
BATTEN GB2 OR GB4
CLIP C1 (OMIT WASHER)
3/8" X 1 1/2" HEX. HD. BOLT (CONE POINT) WITH WASHER
GABLE PANEL

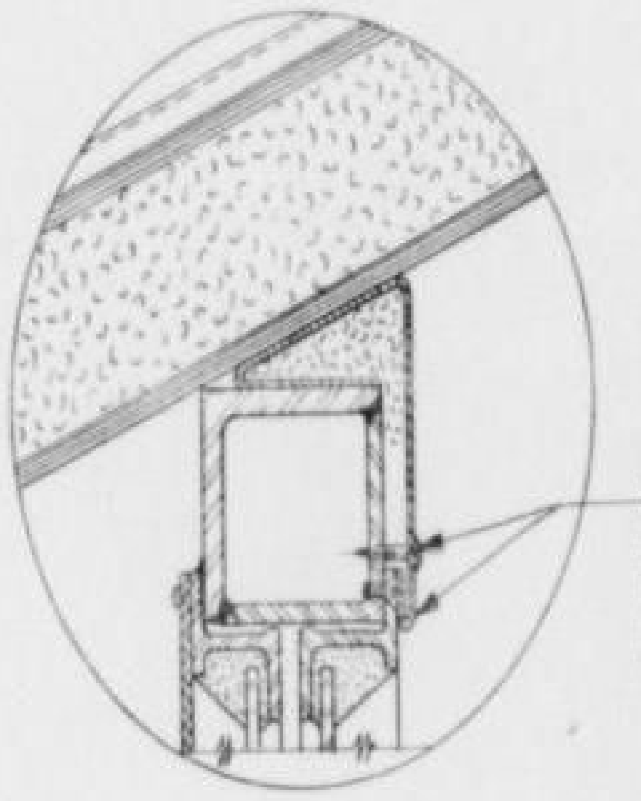
ROOF & GABLE PANEL JOINT
FIG. 1


CAULKING
BATTEN - RB14 (M) OR RB15 (M)
CAULKING
ROOF PANEL
ROOF PANEL
3/8" X 1 1/2" HEX. HEAD BOLTS (CONE POINT) USE ONE WASHER ON TYPE 17 & 18 ROOF TRUSSES AND 3 WASHERS ON TYPE 17A & 18A ROOF TRUSSES
ROOF TRUSS

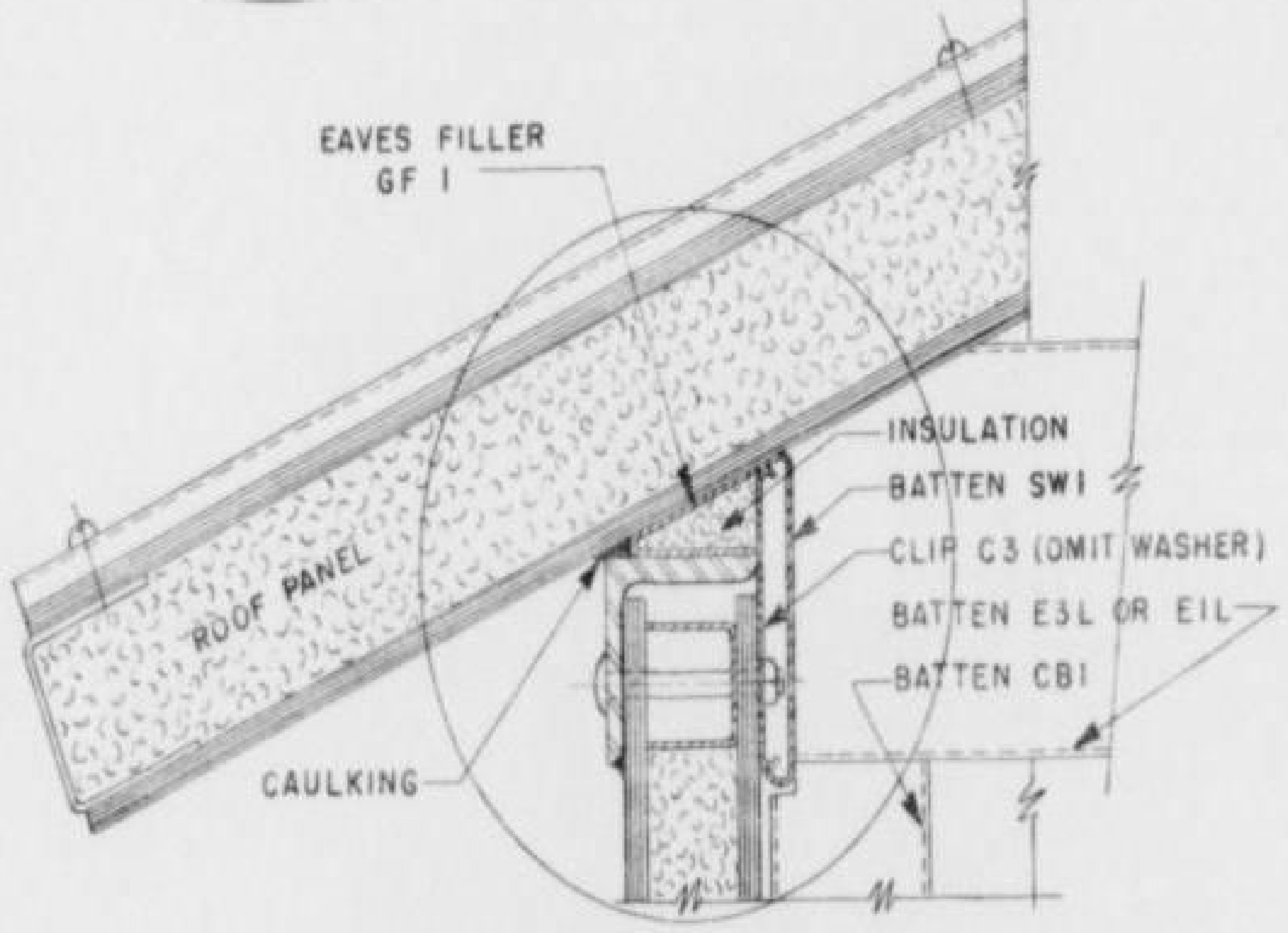
ROOF PANEL JOINT
FIG. 2



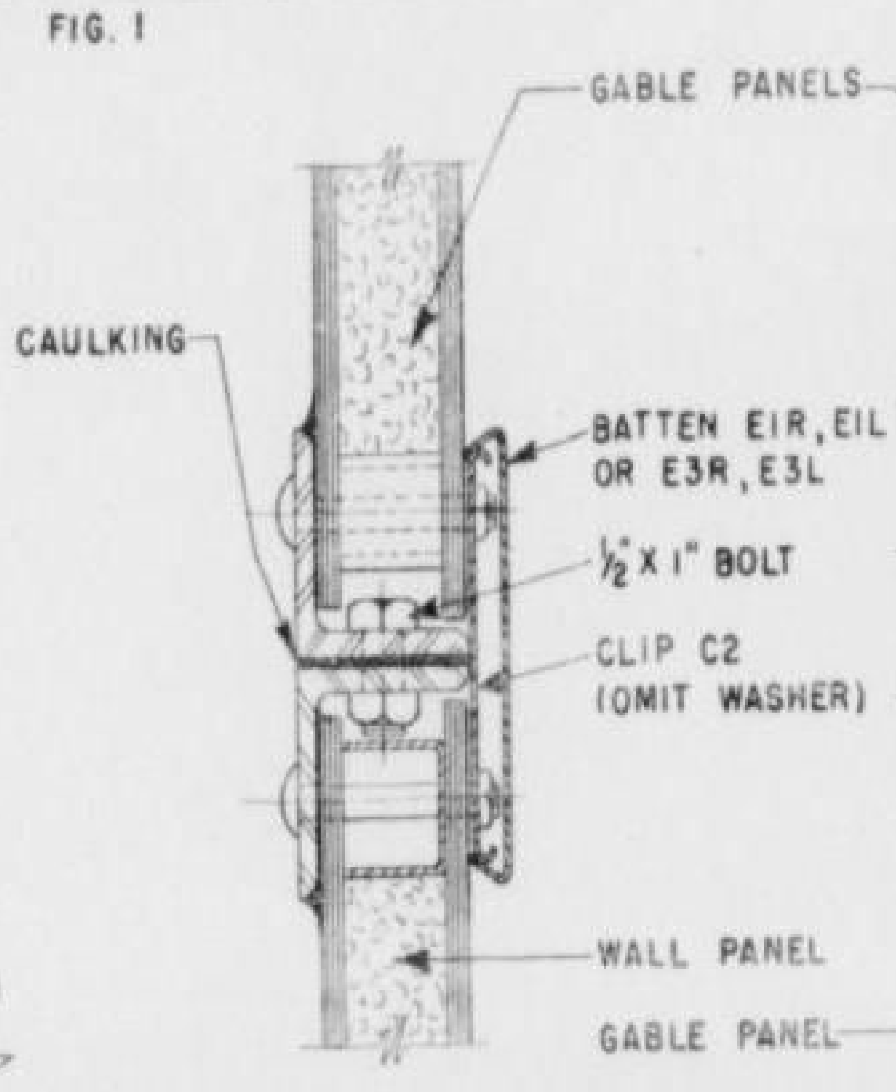
ROOF RIDGE JOINT
FIG. 3



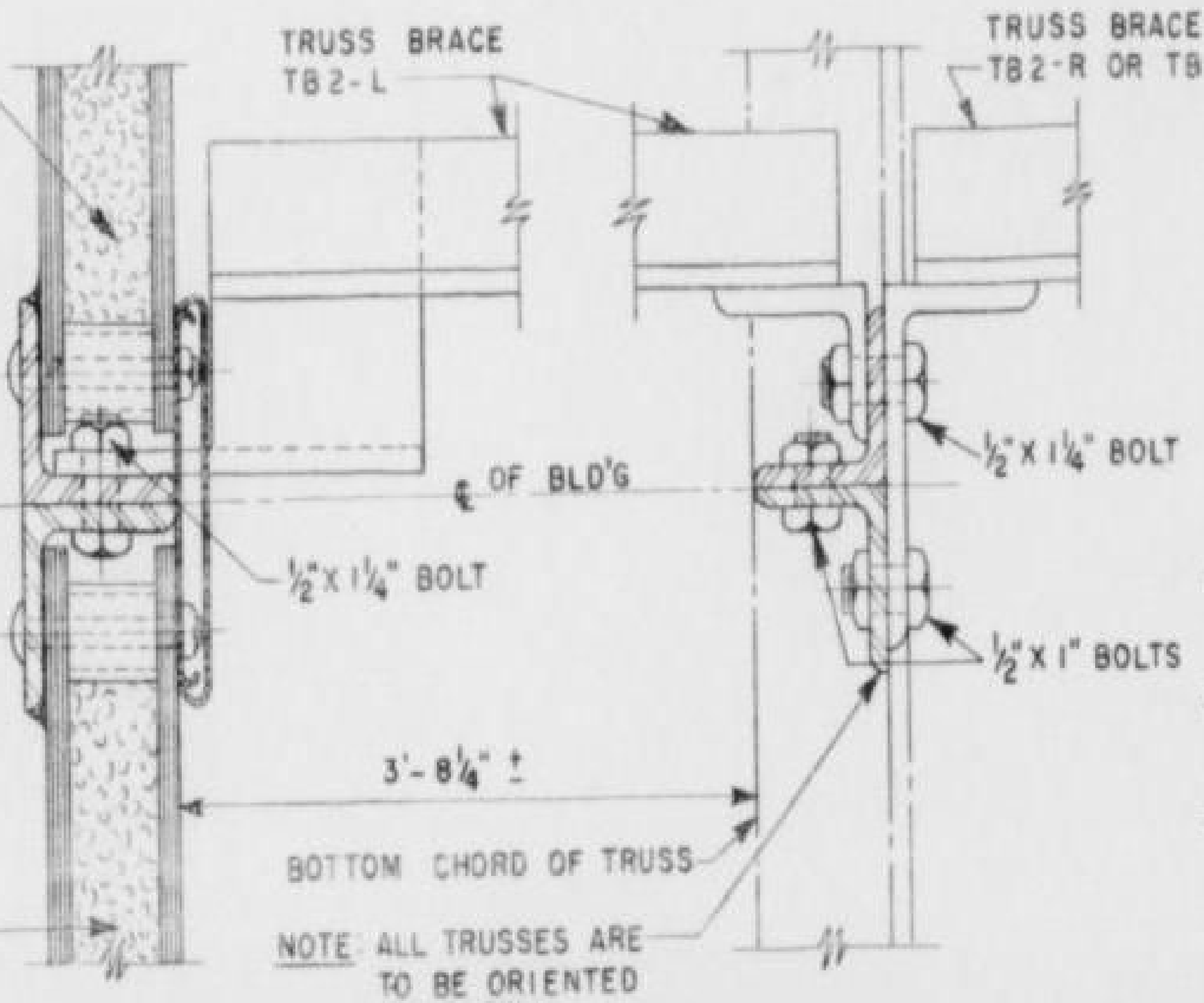
NOTE:
OVER WINDOW IN TYPE 5A AND 6A PANEL, BEND LOWER EDGE BATTEN UNDER AND FASTEN WITH NO. 8 X 3/4" S.T.S.M. SCREWS



ROOF & WALL PANEL JOINT
FIG. 4



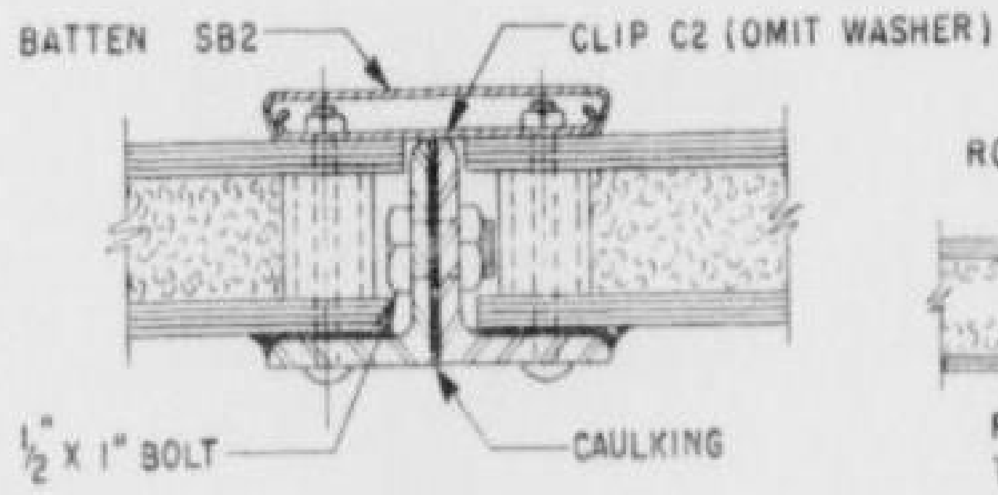
GABLE & WALL PANEL JOINT
FIG. 6



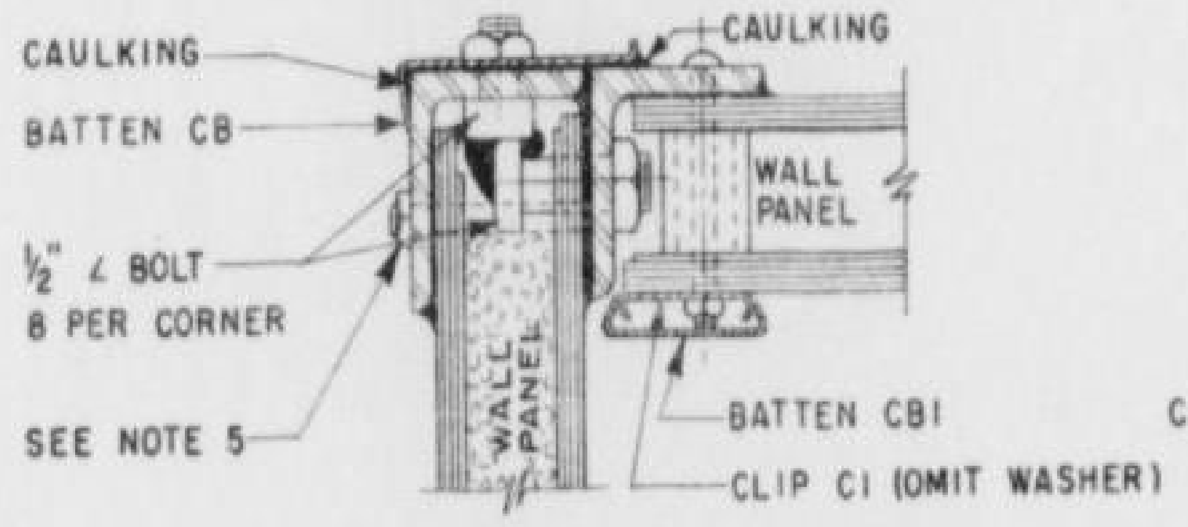
PLAN OF TRUSS BRACE CONNECTIONS
FIG. 7
SEE NOTE 8

NOTES

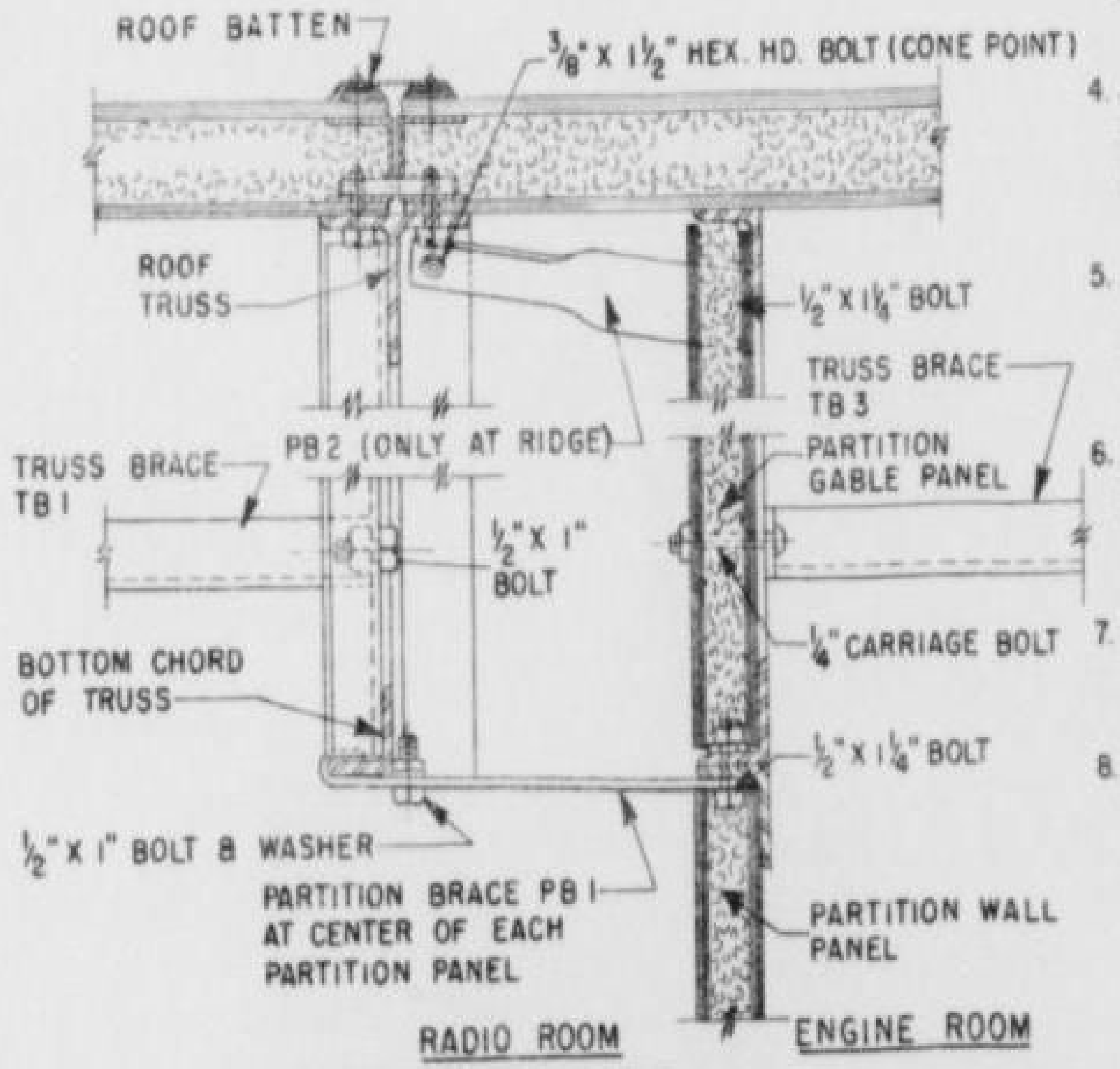
1. ALL JOINTS TO BE SEALED WITH ELASTIC CAULKING COMPOUND SPREAD IN FLAT BEAD, DO NOT LUMP.
2. ERECT SIDE WALLS COMPLETE BEFORE TIGHTENING ANCHOR BOLTS.
3. TO INSTALL BATTENS: REMOVE NUTS AND WASHERS FROM BOLTS, PLACE CLIP IN POSITION AND TIGHTEN WITH NUTS, DO NOT BIND, DISCARD WASHERS, LINE UP CLIPS WITH LIGHT TAPS, AND SNAP BATTENS IN PLACE BY CATCHING ONE LIP ON THE CLIPS AND FORCING THE OTHER LIP OVER BY LIGHT HAMMER BLOWS. ON G.B. BATTENS AND SW1 BATTENS THE TOP LIP MUST BE CAUGHT FIRST AND LOWER LIP SNAPPED ON. ON CB1 THE LIP NEAREST THE WALL MUST BE CAUGHT FIRST.
4. ADJACENT PANELS TO BE JOINED WITH 5 BOLTS, 1/2 X 1", 2 FT. O.C., 8 SPECIAL "∠" BOLTS REQUIRED AT EACH CORNER (SEE FIG. 8)
5. AT EACH OUTSIDE CORNER REVERSE 11 PANEL BOLTS TO INSURE A SNUG FIT. TAKE CARE NOT TO DISPLACE PIPE SPACERS.
6. EACH 8 FT. BATTEN REQUIRES 4 CLIPS EQUALLY SPACED. EACH 4 FT. BATTEN, OR SMALLER BATTEN REQUIRES 2 CLIPS.
7. BEFORE PLACING ROOF RIDGE, FILL THE RIDGE WITH INSULATION.
8. IF "A" FRAME ROOF TRUSS IS FURNISHED, SEE DR. D-1702-10A FOR TYPICAL ERECTION DETAILS. NO TRUSS TIES REQUIRED ON 12 FT. BUILDINGS.



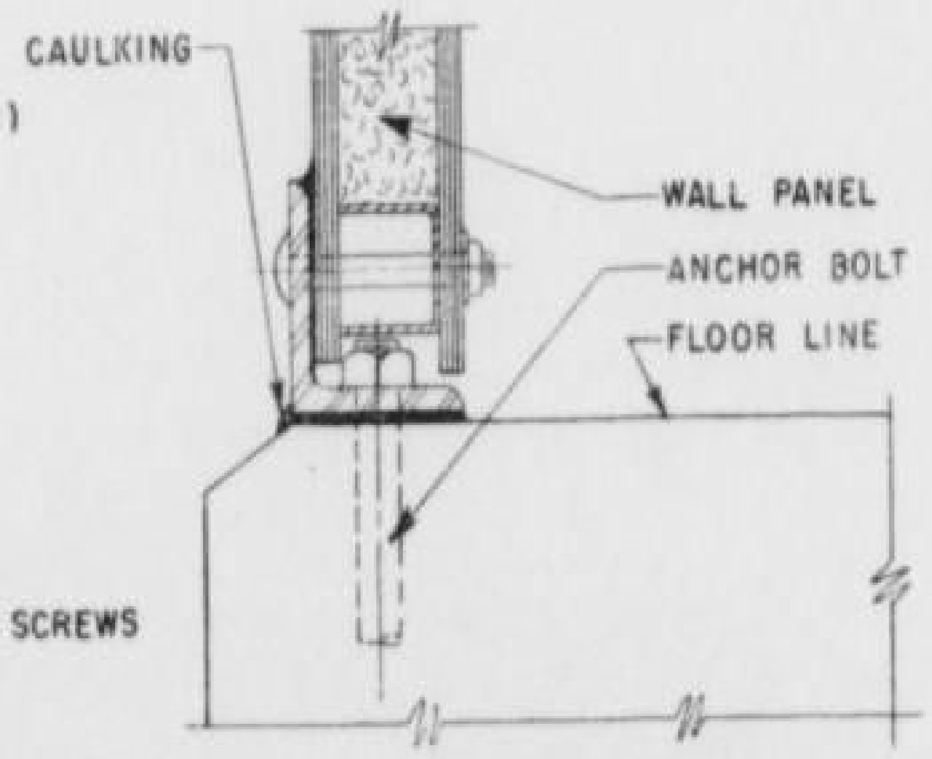
WALL PANEL JOINT
FIG. 9



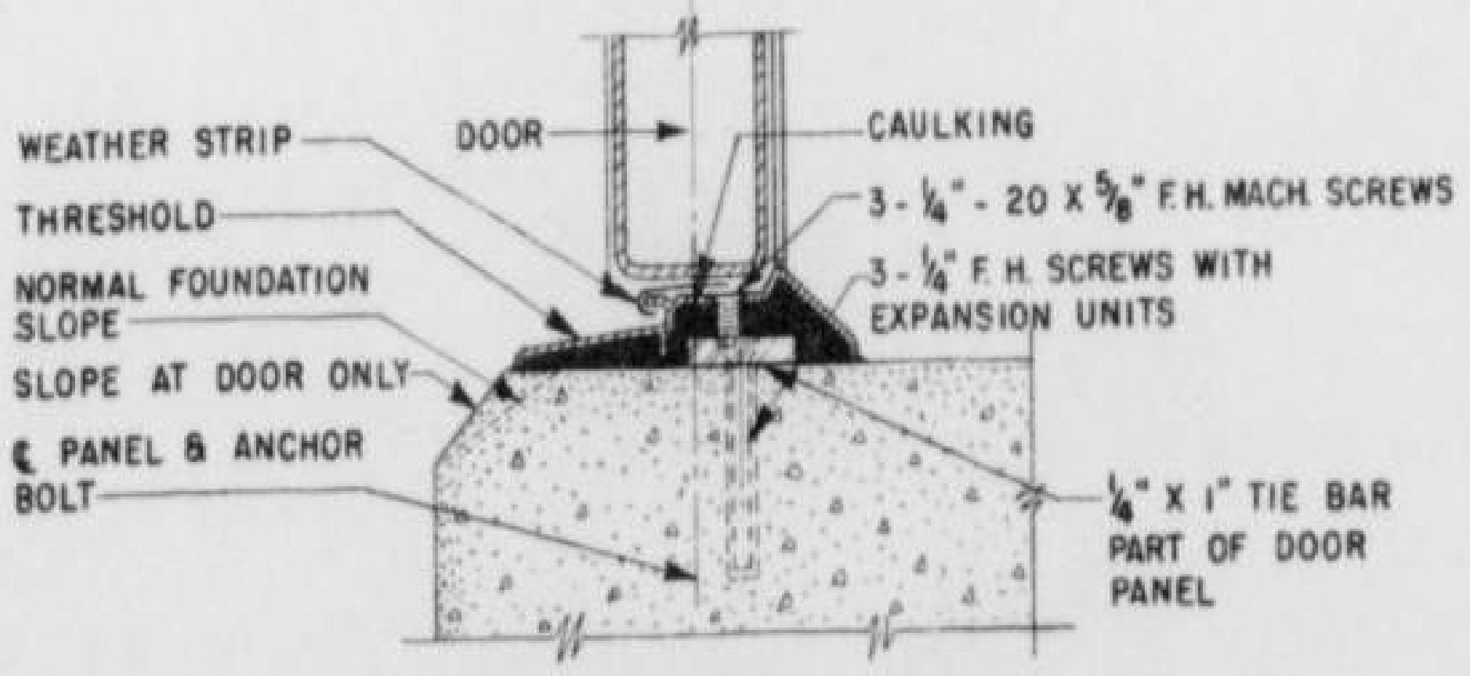
WALL PANELS AT CORNER
FIG. 8



PARTITION GABLE TIE FIG. 12



WALL PANEL AT FLOOR
FIG. 11


WEATHER STRIP
THRESHOLD
DOOR
CAULKING
3 - 1/4" - 20 X 5/8" F.H. MACH. SCREWS
3 - 1/4" F.H. SCREWS WITH EXPANSION UNITS
NORMAL FOUNDATION SLOPE
SLOPE AT DOOR ONLY
℄ PANEL & ANCHOR BOLT
1/4" X 1" TIE BAR PART OF DOOR PANEL

DOOR PANEL AT FLOOR
FIG. 10

NO.	REVISION	DATE	CHECKED
7	ROOF BOLTS	9-14-50	
6	REDRAWN & REVISED	7-5-50	

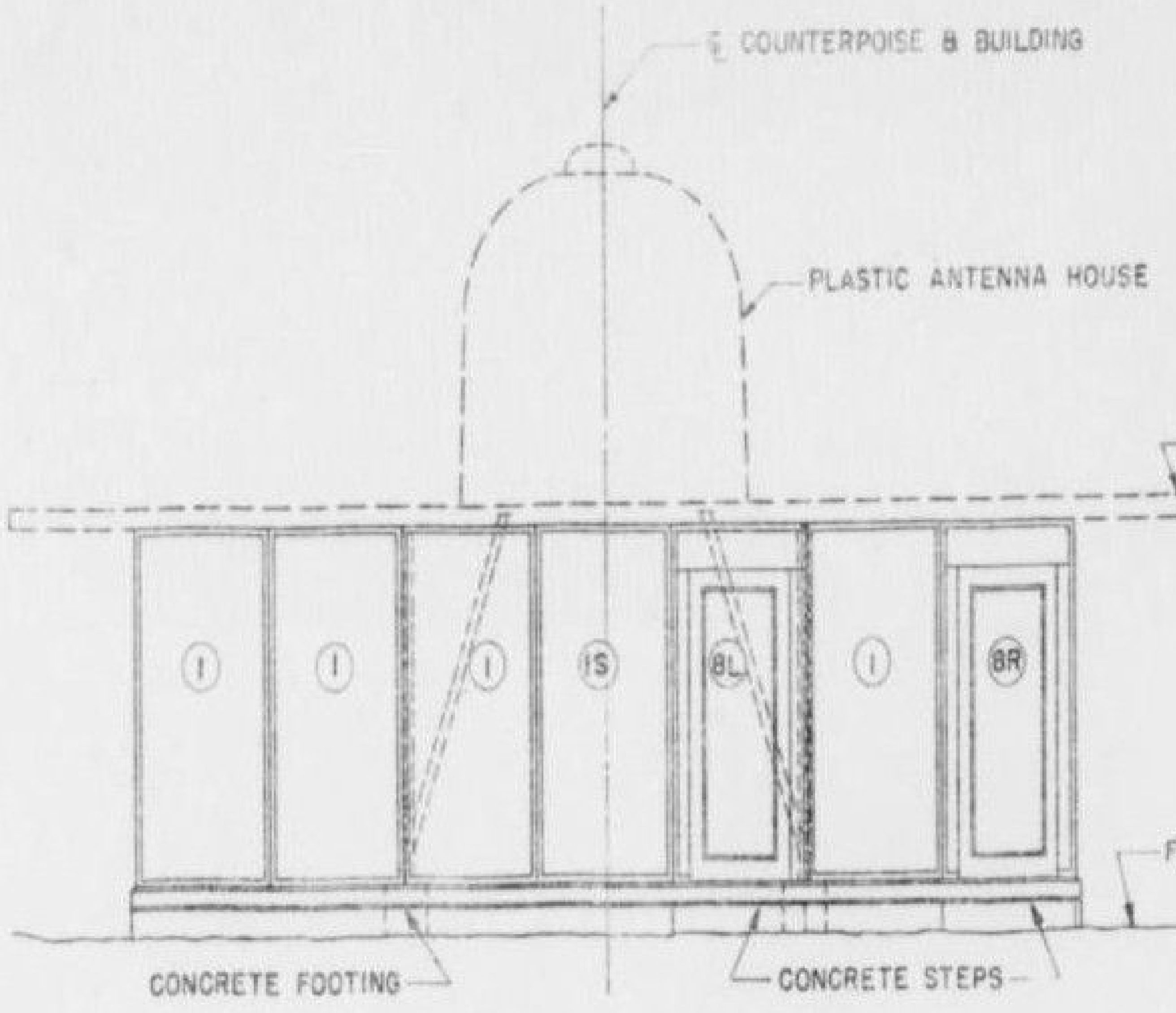
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

TYPICAL PANEL JOINTS
FOR TYPE "S" BUILDINGS

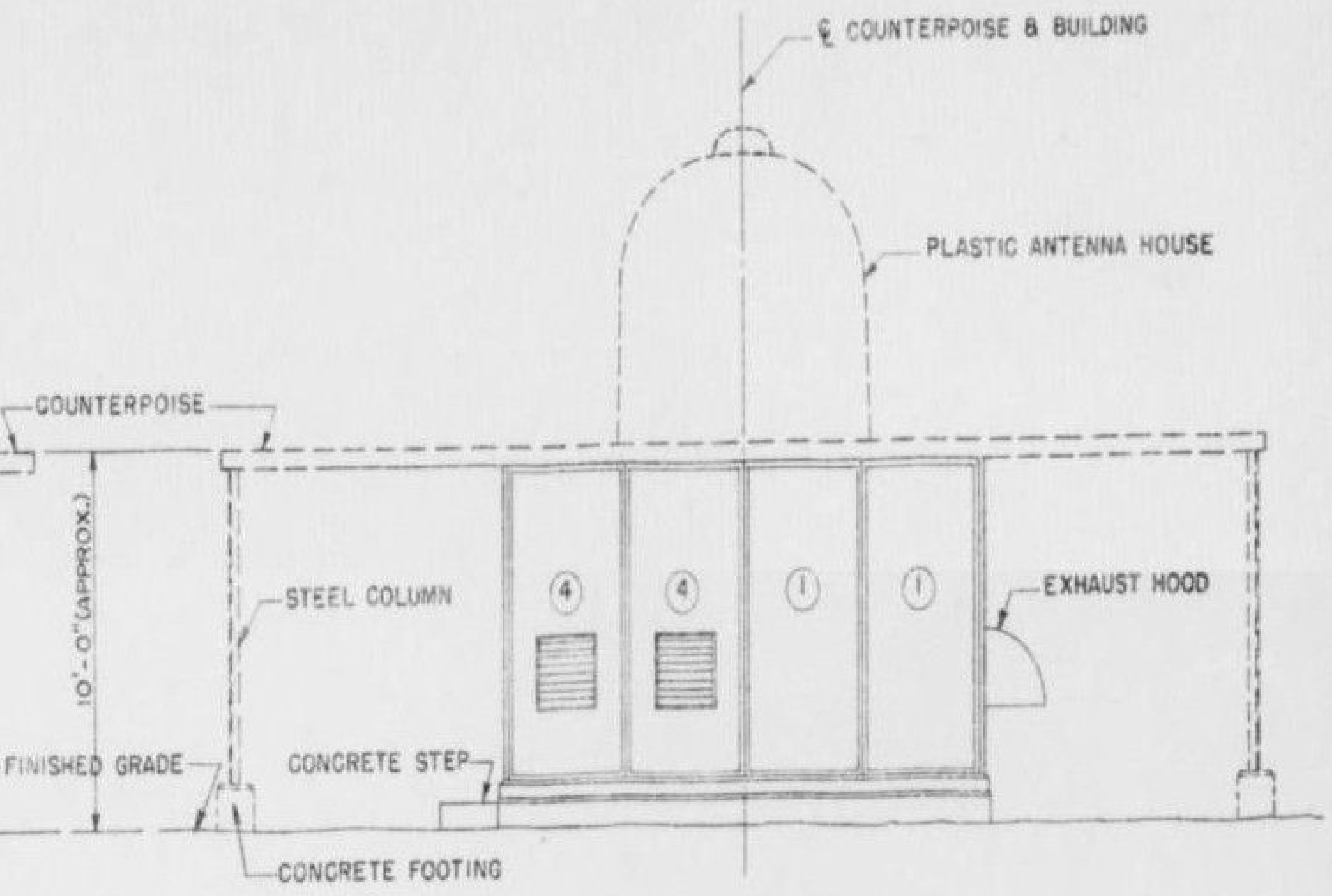
APPROVED: C. M. LAMPLE
C. M. Lample
CHIEF AIRWAYS ENGINEERING DIVISION
SUBMITTED BY: Geo. P. Stratton
CHIEF OF SECTION
CHECKED: HRC
DESIGNED:
DRAWN: F.S.K.
TRACED: J.F.F.
DATE: 10-8-41
DR. D-1702-10

PARTS LIST
16'x28' VHF BLDG

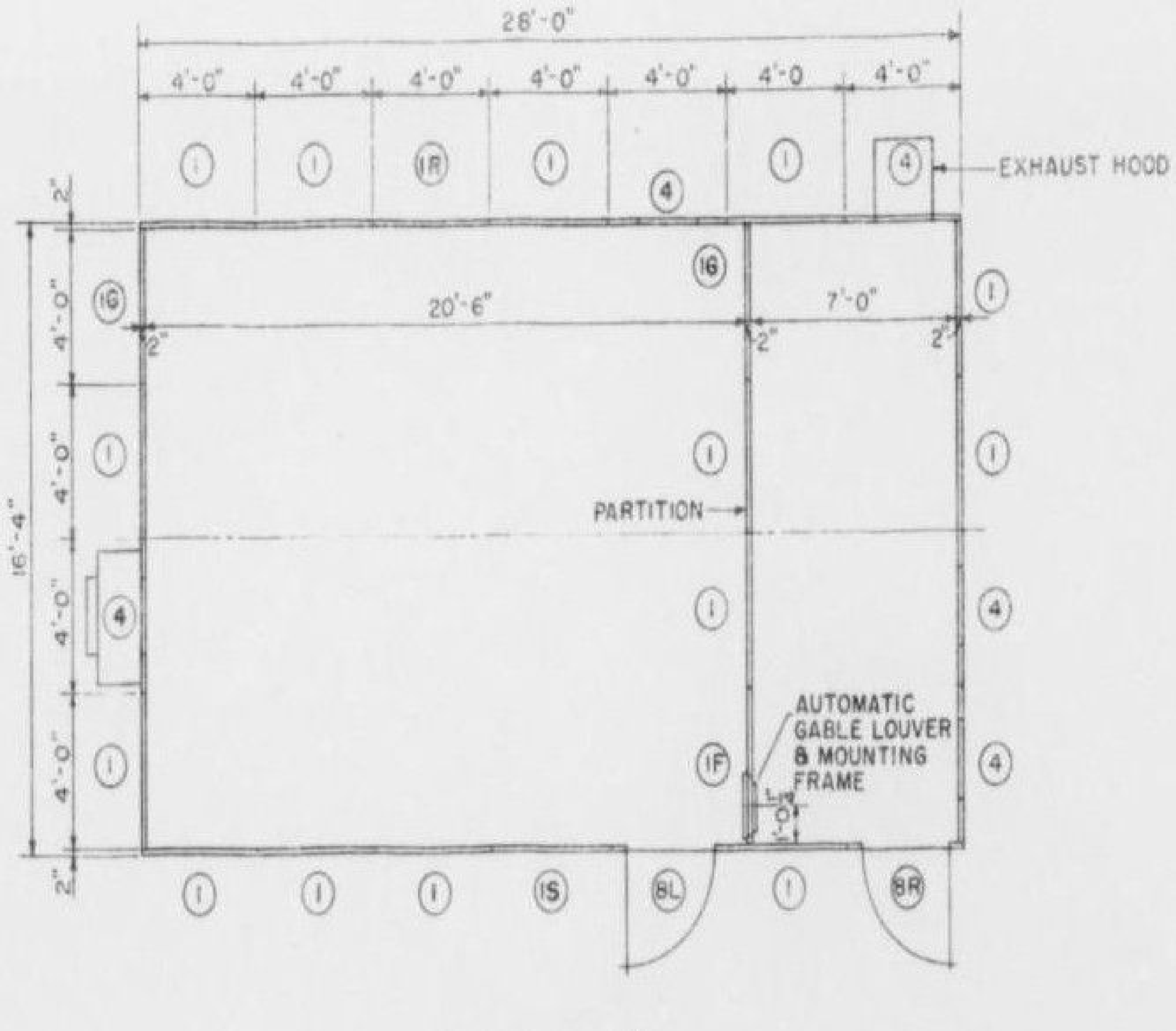
TYPE No.	No. REQ'D	DWG No.	DESCRIPTION
1	14	D-1701-4	WALL PANEL - PLAIN
1F	1	D-1701-5A	WALL PANEL WITH CABINET BARS
1G	2	D-1701-5A	WALL PANEL WITH VOLTAGE REGULATOR BARS
4	5	D-1701-8	WALL PANEL WITH LOUVER OPENING
8L	1	D-1701-12	DOOR PANEL L.H.
8R	1	D-1701-12	DOOR PANEL R.H.
CB	4	D-1701-24	OUTSIDE CORNER BATTEN
SB1B	12	D-1701-25	INSIDE WALL BATTEN - BOTTOM
SB1T-S	12	D-1701-25A	INSIDE WALL BATTEN - TOP
SB2	9	D-1701-25	INSIDE WALL BATTEN - 8'-0"
CB1	6	D-1701-25	INSIDE CORNER BATTEN
C1	26	D-1701-24	CLIP FOR 2" INSIDE BATTEN
C2	72	D-1701-24	CLIP FOR 4" INSIDE BATTEN
FB	24	D-1701-25	FLOOR BATTEN
1R	1	D-1701-5E	WALL PANEL WITH BARS
1S	1	D-1701-5E	WALL PANEL WITH BARS
	2	D-1701-26,32	FIXED WALL LOUVER WITH FIRE DOORS
	1	D-1701-26	FIXED WALL LOUVER ONLY
	8		FILTER MEDIA, 20" x 20" x 1"
	1	D-3338-14	AIR FILTER HOUSING 3200 CFM TYPE TT
	1	B-3317-11	REMOVABLE AIR DUCT FOR 8KVA
	1	D-4573-1	EXHAUST HOOD
	1	C-1701-23A	AUTOMATIC GABLE LOUVER
	1	C-1701-23E	AUTOMATIC GABLE LOUVER MOUNTING FRAME
	116		½" x 1" HEX BOLT & NUT
	36		½" "L" WELDED BOLT & HEX NUT
	7		¼" x 3" CARRIAGE BOLT & HEX NUT
	7		⅜" x 2" LAG SCREW WITH EXPANSION SHIELD
	7		¼"-20 x ⅝" F.H. MACHINE SCREW
	1		DOOR STOP & HOLDER - L.H.
	1		DOOR STOP & HOLDER - R.H.
	6		CAULKING COMPOUND (GAL'S)
	2700		INSULATION (CU. IN.)
BOLTS FOR INSTALLING TYPE TT AIR FILTER			
	7		¼" x 2½" F.H. STOVE BOLTS
	5		#8 x ¾" F.H. SHEET METAL SCREWS
	27		¼"-20 x ⅝" R.H. MACHINE SCREWS
	27		¼"-20 HEX NUTS
	36		¼" LOCKWASHERS
	2		¼" x 2½" CARRIAGE BOLTS



FRONT ELEVATION



RIGHT ELEVATION



FLOOR PLAN

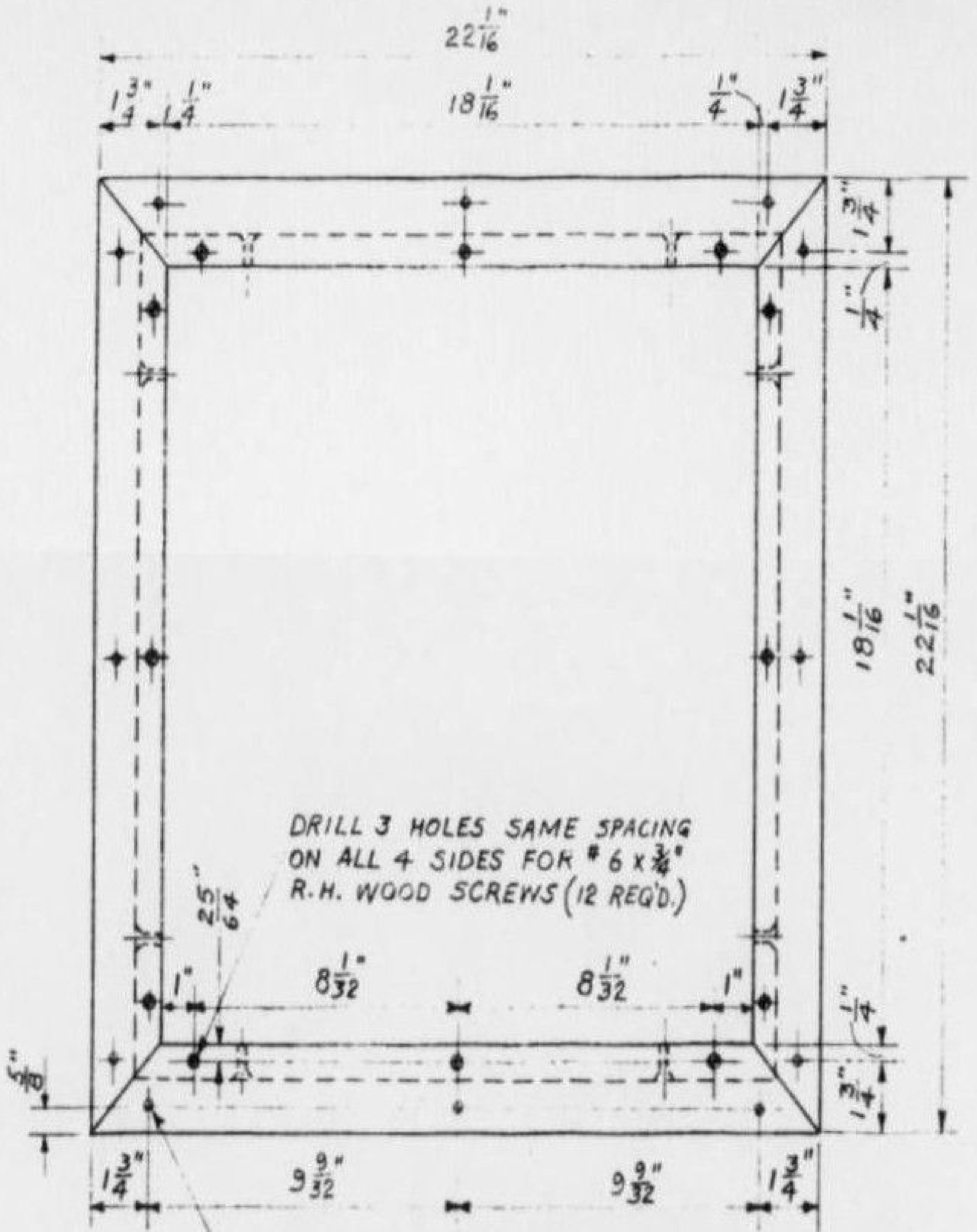
NOTE
SEE DRAWING D-1702-48 FOR TYPE OF VENTILATION.

NO.	REVISION	DATE	CHECKED
4	CHANGED PARTS LIST	10-17-52	
3	CHANGED MOUNTING BARS	8-6-51	
2	REVISED PARTS LIST	7-27-50	
1	REVISED PARTS LIST, RELOCATED PANELS	6-16-50	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

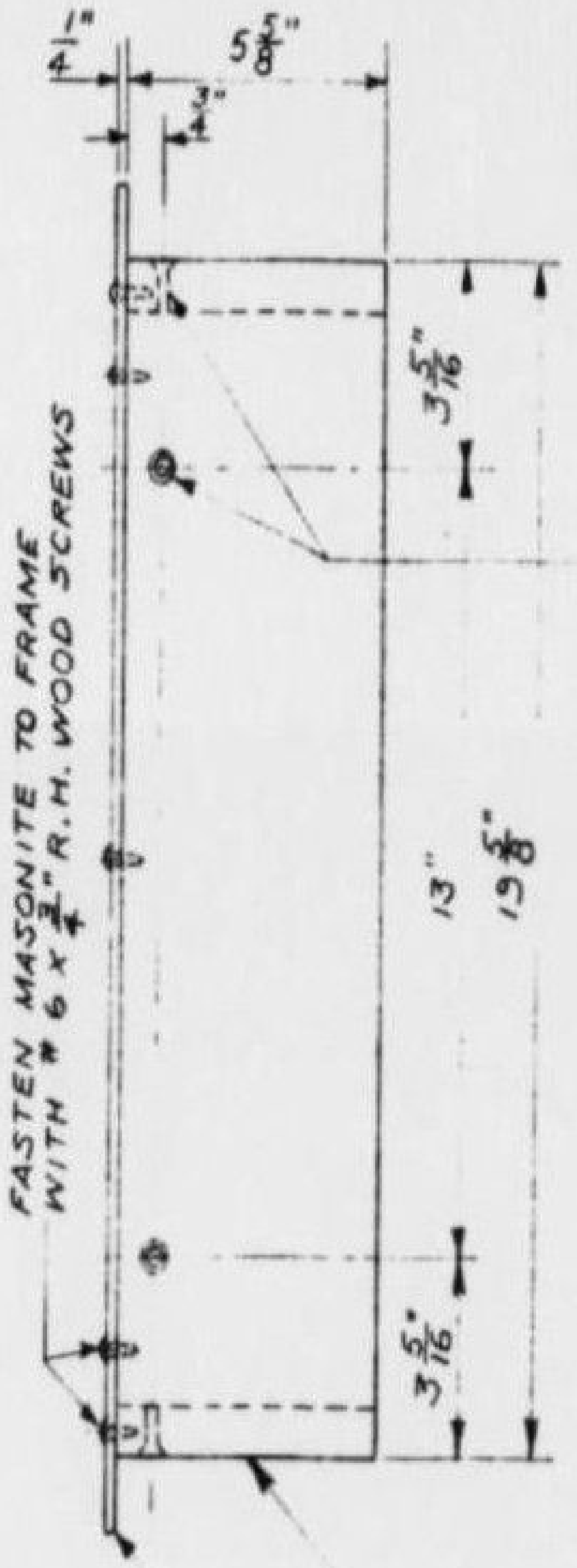
VHF OMNIRANGE
16'x28' TYPE "S" BLDG. WITH COUNTERPOISE ROOF
PLAN & ELEVATIONS

APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF, STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: Frank H. Coggeshall
CHIEF OF SECTION
CHECKED
DESIGNED M.R.C.
DRAWN T.A.S.
TRACED F.S.K.
DATE 3-31-50
DR. D-1701-2AC



DRILL 3 HOLES SAME SPACING ON ALL 4 SIDES FOR #6 x 3/4" R.H. WOOD SCREWS (12 REQ'D.)

DRILL 3-11/64" HOLES SAME SPACING ON ALL FOUR SIDES FOR #8 x 1" R.H. WOOD SCREWS TO MOUNT FRAME TO WALL PANEL

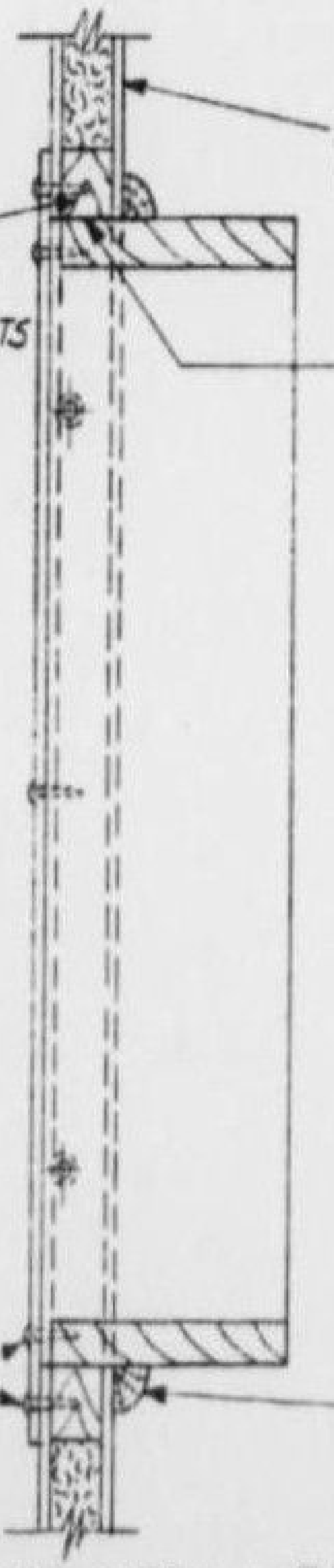


FASTEN MASONITE TO FRAME WITH #6 x 3/4" R.H. WOOD SCREWS

DRILL TWO 17/64" HOLES IN EACH SIDE AND CSK. FOR 1/4"-20 x 1 3/8" FLAT HEAD M.S. TO FASTEN LOUVER IN FRAME. (8 REQ'D.)

1 x 6 WHITE PINE FRAME

1/4" MASONITE FACING



WALL OF ROOM INTO WHICH LOUVER OPENS

1 5/16" x 1 5/16" WOOD BLOCK FILLER AROUND OPENING BETWEEN MASONITE SHEETS

19 3/4" SQUARE HOLE CUT THROUGH WALL PANEL

#8 x 1" R.H. WOOD SCREWS (12 REQ'D.)

3/4" QUARTER ROUND TRIM NAILED TO WALL ONLY AFTER LOUVER & FRAME ARE INSTALLED

LOUVER FRAME INSTALLATION DETAIL

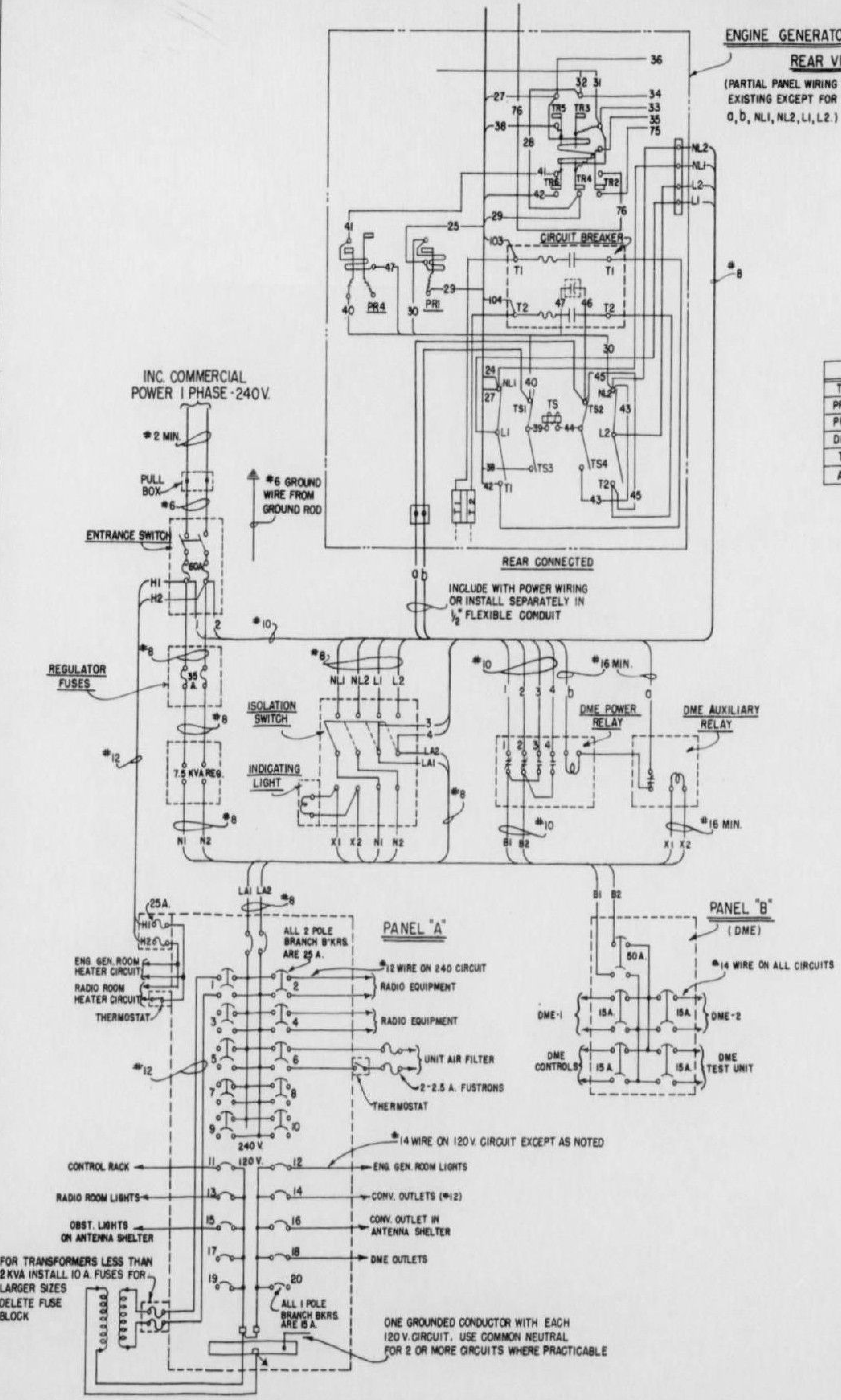
NOTE

INSTALL LOUVER IN FRAME BEFORE FASTENING TO WALL

No.	REVISIONS	DATE	CHECKED

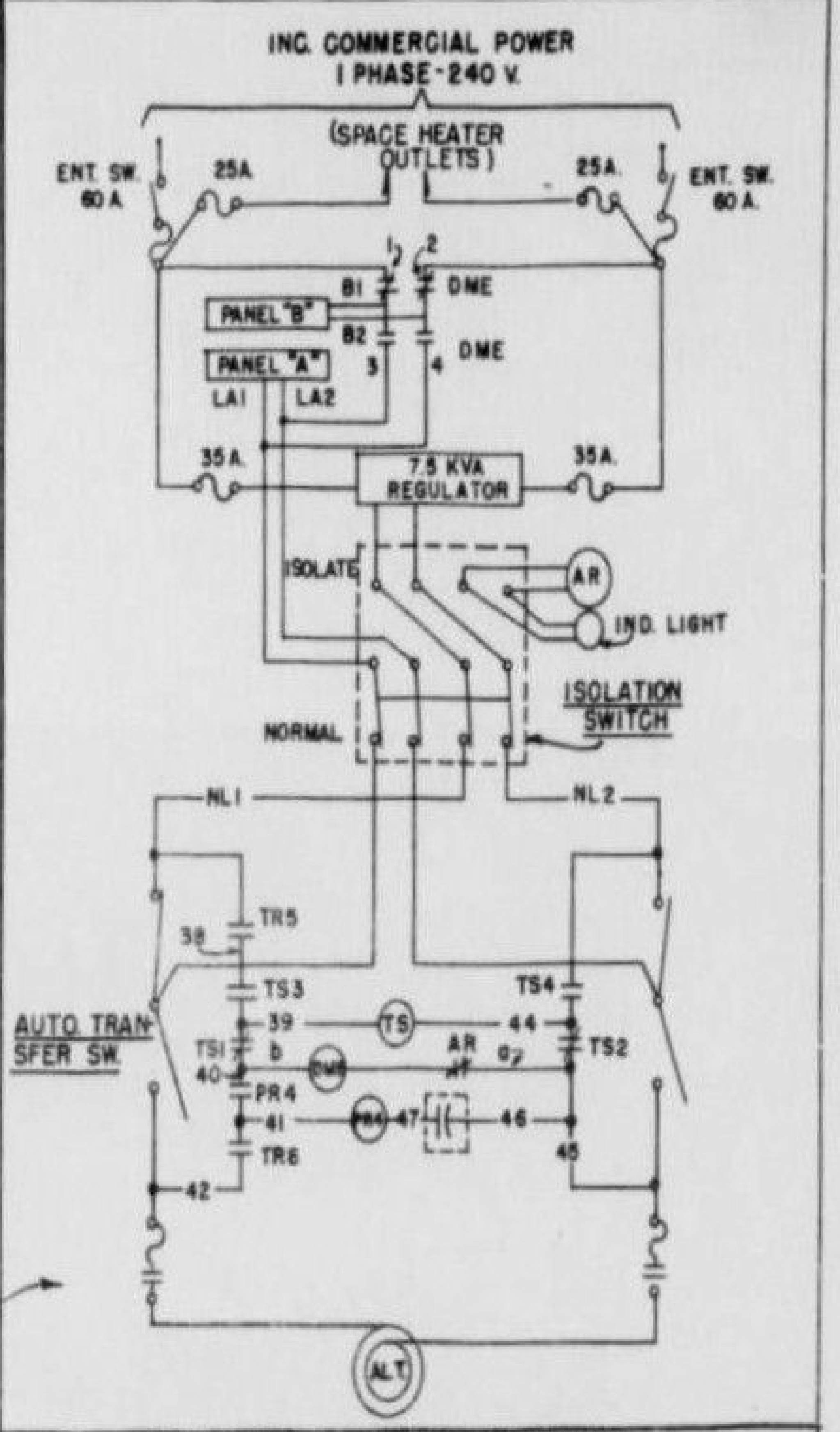
REVIEWED BY:		CIVIL AERONAUTICS ADMINISTRATION OFFICE OF FEDERAL AIRWAYS ESTABLISHMENT ENGINEERING DIVISION	
	AUX. EQUIP	WOOD FRAME FOR MOUNTING GABLE LOUVER IN WALL PANELS CONSTRUCTION & INSTALLATION	
	STR'L MAT'L		
DESIGNED D.H.W.	DRAWN J.F.F.	SUBMITTED BY: Frank H. [illegible] CHIEF: DESIGN AND SPECIFICATION SECTION	APPROVED BY: for R.J. ALPNER CHIEF: STRUCTURES AND LTG. ESTAB. BR.
TRACED	CHECKED	DATE 8-1-50	DR. C-1701-23E

22899


ENGINE GENERATOR SWITCHBOARD
REAR VIEW
(PARTIAL PANEL WIRING ONLY. ALL WIRING EXISTING EXCEPT FOR INTERCONNECTIONS a, b, NL1, NL2, L1, L2.)
CIRCUIT BREAKER
REAR CONNECTED
PR4
PR1
TR5
TR3
TR6
TR4
TR2
TS1
TS2
TS3
TS4
INCLUDE WITH POWER WIRING OR INSTALL SEPARATELY IN 1/2" FLEXIBLE CONDUIT
INC. COMMERCIAL POWER 1 PHASE-240V.
#2 MIN.
PULL BOX
#6
ENTRANCE SWITCH
60A
#6 GROUND WIRE FROM GROUND ROD
H1
H2
#10
REGULATOR FUSES
35 A.
#8
7.5 KVA REG.
N1 N2
#12
ISOLATION SWITCH
INDICATING LIGHT
NL1 NL2 L1 L2
LA2
LA1
X1 X2 N1 N2
DME POWER RELAY
DME AUXILIARY RELAY
#16 MIN.
B1 B2
X1 X2
LA1 LA2
PANEL "A"
25 A.
ALL 2 POLE BRANCH B'KRS. ARE 25 A.
ENG. GEN. ROOM HEATER CIRCUIT
RADIO ROOM HEATER CIRCUIT
THERMOSTAT
#12 WIRE ON 240 CIRCUIT
RADIO EQUIPMENT
RADIO EQUIPMENT
UNIT AIR FILTER
2-2.5 A. FUSTRONS
THERMOSTAT
240 V.
120 V.
#14 WIRE ON 120V. CIRCUIT EXCEPT AS NOTED
CONTROL RACK
ENG. GEN. ROOM LIGHTS
RADIO ROOM LIGHTS
CONV. OUTLETS (#12)
OBST. LIGHTS ON ANTENNA SHELTER
CONV. OUTLET IN ANTENNA SHELTER
DME OUTLETS
FOR TRANSFORMERS LESS THAN 2 KVA INSTALL 10 A. FUSES FOR LARGER SIZES DELETE FUSE BLOCK
ALL 1 POLE BRANCH BKRS. ARE 15 A.
ONE GROUNDED CONDUCTOR WITH EACH 120 V. CIRCUIT. USE COMMON NEUTRAL FOR 2 OR MORE CIRCUITS WHERE PRACTICABLE
PANEL "B"
(DME)
50A.
#14 WIRE ON ALL CIRCUITS
DME-1
DME-2
15A.
DME CONTROLS
DME TEST UNIT

SYMBOLS	
TS	TRANSFER SWITCH
PR1	POTENTIAL RELAY - NORMAL
PR4	POTENTIAL RELAY - EMERGENCY
DME	DME POWER RELAY
TR	TRANSFER RELAY
AR	DME AUXILIARY RELAY

FOR COMPLETE ENG. GEN. SCHEMATIC SEE APPLICABLE MANUFACTURERS DRAWING



SCHEMATIC WIRING DIAGRAM

NOTES

1. THE ENGINE GENERATOR DIAGRAM APPLIES ONLY TO THE 1φ - 240V. 8KVA AUTOMATIC ENGINE GENERATOR MANUFACTURED BY: THE DUPLEX TRUCK CO.
2. ALL RELAYS ARE SHOWN DE-ENERGIZED.
3. SEE DR'WG. D-1702-48A FOR THE COMPLETE ELECTRICAL LAYOUT.
4. ALL WIRE SIZES SHOWN ARE AWG 600 V. INSULATED. WIRE SIZES IN ALL CASES SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
5. HEATER CIRCUITS ARE UNREGULATED, CONNECT DIRECTLY TO INCOMING COMMERCIAL POWER, AS SHOWN. HEATER FRAME TO BE GROUNDED.
6. GROUND ALL NON-CURRENT CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT WITH # 6 BARE WIRE.
7. RUN # 6 BARE WIRE TO ENG. GEN. ALONG WITH WIRING FOR GROUNDING.

DESCRIPTION OF DME RELAY OPERATIONS

DME POWER RELAY - THIS RELAY FUNCTIONS AS FOLLOWS:

(1) BY-PASSES MAIN REGULATOR CAUSING DME TO DRAW LOAD DIRECTLY FROM COMMERCIAL POWER WHEN POWER CONDITIONS ARE NORMAL; CONTACTS 1 & 2 CLOSED, 3 & 4 OPEN.

(2) CHANGES DME LOAD TO THE ENG. GEN. IN EVENT OF COMMERCIAL POWER FAILURE; CONTACTS 1 & 2 OPEN, 3 & 4 CLOSED. RETURNS LOAD TO NORMAL POWER WHEN COMMERCIAL POWER IS RESTORED. THE RELAY COIL IS INTERLOCKED WITH THE ENG. GEN. AS SHOWN SO THAT ITS OPERATION PARALLELS THAT OF THE TRANSFER SWITCH

AR RELAY - THIS RELAY PREVENTS CHANGING DME LOAD TO THE REGULATED COMMERCIAL POWER SUPPLY WHEN ISOLATION SWITCH IS PLACED IN ISOLATE POSITION AND ENG. GEN. IS TEST RUN.

NO.	REVISION	DATE	CHECKED
4.	ADDED PULL BOX	12-5-52	
3.	REVISED WIRE SIZES	8-13-52	C&H
2.	CHANGED WIRE SIZES	3-10-52	
1.	ADDED DME OUTLETS TO PANELS "A" & "B"	6-8-51	

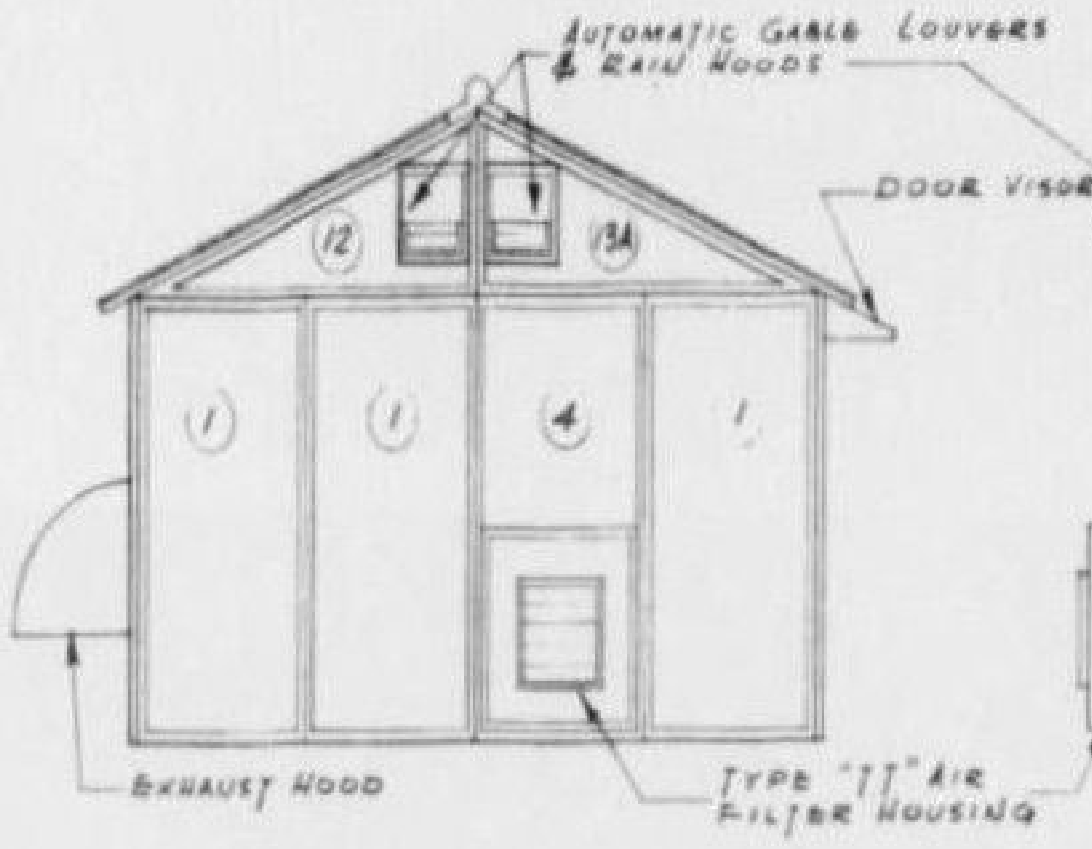
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VOR/ DME
POWER WIRING DIAGRAM

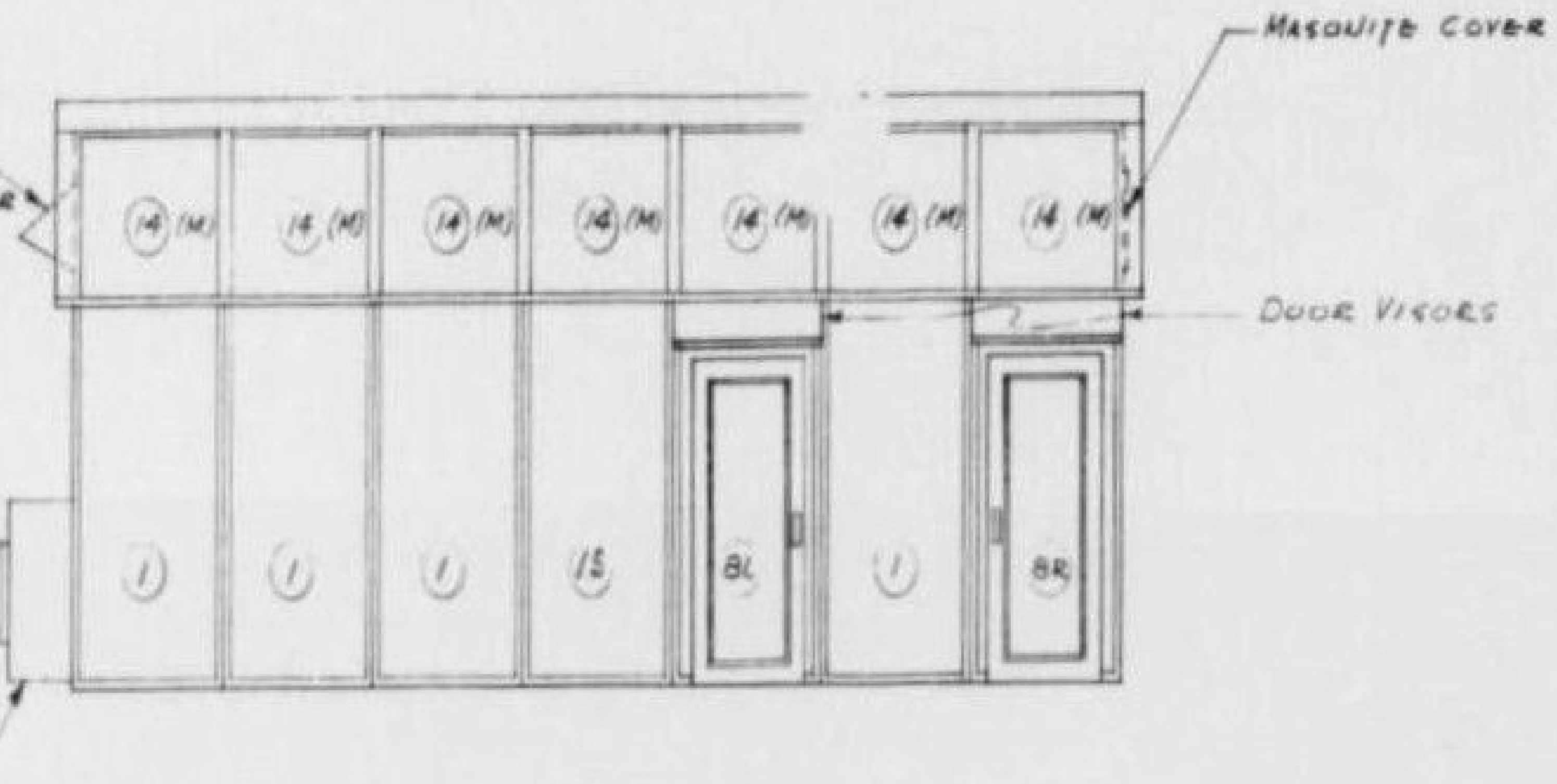
APPROVED: R. Strauss for R. L. ALPHER
CHIEF, STRUCTURES AND LTG. ESTAB. BR.
SUBMITTED BY: Frank H. Cosgrove
CHIEF, DESIGN AND PROG. BRANCH
CHECKED ADS
DESIGNED J.J.G.
DRAWN J.J.P.
TRACED D.G.C.
DATE 3-8-51
DR. D-1702-48 B

PARTS LIST FOR ONE BLDG.

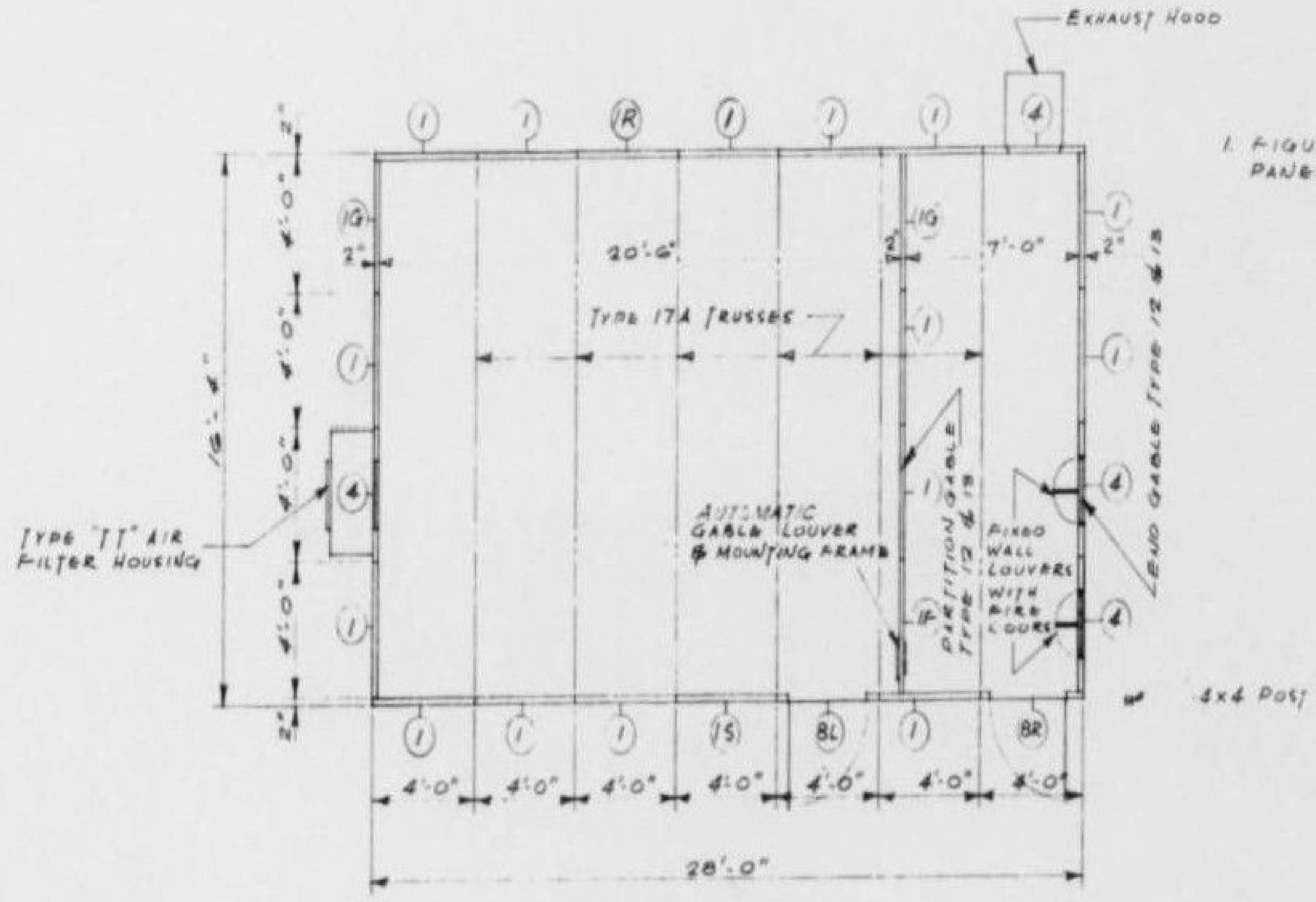
TYPE No.	No. REQ.	DWG. No.	DESCRIPTION
1	15	D-1701-4	WALL PANEL, PLAIN
1F	1	D-1701-5A	WALL PANEL WITH CABINET BARS AND TRANS. BARS
1G	2	D-1701-5A	WALL PANEL WITH VOLTAGE REG. BARS
4	4	D-1701-8	WALL PANEL WITH LOUVER OPENING
8R	1	D-1701-12-15P	DOOR PANEL - RIGHT HAND
8L	1	D-1701-12-15P	DOOR PANEL - LEFT HAND
12	3	D-1701-16	LARGE GABLE PANEL - L.H. WITH OPG
13A	1	D-1701-17A	LARGE GABLE PANEL - R.H. WITH OPG
14(M)	14	D-1701-18	LARGE ROOF PANEL, PLAIN
13	2	D-1701-17	LARGE GABLE PANEL, R.H. PLAIN
1R	1	D-1701-5E	WALL PANEL WITH BARS
1S	1	D-1701-5E	WALL PANEL WITH BARS
17A	6	D-1701-21A	16' "A" TRUSS
T1	12	D-1701-21A	"A" TRUSS PART
T2	12	D-1701-21A	"A" TRUSS PART
T3	6	D-1701-21A	"A" TRUSS PART
T4	24	D-1701-21A	"A" TRUSS PART
T5	6	D-1701-21A	"A" TRUSS PART
KB2L	2	D-1701-21A	KNEE BRACE - L.H.
KB2R	2	D-1701-21A	KNEE BRACE - R.H.
TB4B	2	D-1701-25A	TRUSS BRACE
TB5B	1	D-1701-25A	TRUSS BRACE
TB6B	1	D-1701-25A	TRUSS BRACE
TB9B	2	D-1701-25A	TRUSS BRACE
PB1-SR	1	D-1701-25A	PARTITION BRACE - R.H.
PB1-SL	1	D-1701-25A	PARTITION BRACE - L.H.
PB2-S	1	D-1701-25A	PARTITION TIE AT RIDGE
RTB	80	D-1701-24	ROOF TIE BAR
OL-14R(M)	2	D-1701-25	OUTLOOKER, RIGHT HAND
OL-14L(M)	2	D-1701-25	OUTLOOKER, LEFT HAND
F(M)	2	D-1701-24	ROOF FINIAL
RR1(M)	1	D-1701-24	ROOF RIDGE - 4'-8"
RR2(M)	3	D-1701-24	ROOF RIDGE - 8'-8"
RB14(M)	12	D-1701-24	ROOF BATTEN
CB	4	D-1701-24	OUTSIDE CORNER BATTEN
SB1B	12	D-1701-25	INSIDE WALL BATTEN - BOTTOM
SB1T-S	12	D-1701-25A	INSIDE WALL BATTEN - TOP
SB2	9	D-1701-25	INSIDE WALL BATTEN - 7'-10"
CB1	6	D-1701-25	INSIDE CORNER BATTEN
E1-SL	2	D-1701-25	BATTEN OVER END WALL - L.H.
E1-SR	2	D-1701-25	BATTEN OVER END WALL - R.H.
GB-2R	3	D-1701-25	GABLE BATTEN - R.H.
GB-2L	3	D-1701-25	GABLE BATTEN - L.H.
GB1-S	3	D-1701-25A	GABLE JOINT BATTEN
E2-SR	1	D-1701-25A	PARTITION BATTEN - TOP RIGHT
E2-SL	1	D-1701-25A	PARTITION BATTEN - TOP LEFT
E2-S	3	D-1701-25	PARTITION BATTEN - TOP CENTER
GF1	14	D-1701-25	EAVES FILLER
SP1	2	D-1701-25	INSIDE BATTEN - LONG
SP2	2	D-1701-25	INSIDE BATTEN - SHORT
SW1	12	D-1701-25	INSIDE BATTEN - SIDE WALL
RB1	7	D-1701-25	RIDGE BATTEN
FB	24	D-1701-25	FLOOR BATTEN
C1	58	D-1701-24	CLIP FOR 2" INSIDE BATTEN
C2	140	D-1701-24	CLIP FOR 4" INSIDE BATTEN
C3	42	D-1701-24	CLIP FOR SW1 BATTEN
	3	C-1701-23A	AUTOMATIC GABLE LOUVER
	2	D-1701-31	RAIN HOOD FOR GABLE LOUVER
	1	D-1701-26	FIXED WALL LOUVER ONLY
	2	D-1701-26&32	FIXED WALL LOUVER WITH FIRE DOORS
	1	D-3398-14	AIR FILTER HOUSING, TYPE "TT"
	1	C-1701-29S	FRAME FOR M'TG GABLE LOUVER
	1	D-4573-1	EXHAUST HOOD, SMALL
	2	C-1701-29B	DOOR VISOR
	8		FILTER MEDIA, 20"x20"x1"
	1		REMOVABLE AIR DUCT TO FIT ENG.GEN


AUTOMATIC GABLE LOUVERS & RAIN HOODS
DOOR VISOR
12
13A
1
1
4
1
EXHAUST HOOD
TYPE "TT" AIR FILTER HOUSING

LEFT ELEVATION



FRONT ELEVATION



FLOOR PLAN

NOTE
1. FIGURES IN CIRCLES REFER TO PANEL TYPES.

PARTS LIST (CONT'D)

No. REQ.	DESCRIPTION
66	1/2"x1 1/2" HEX HEAD BOLT & NUT
25	1/2"x1 1/4" HEX HEAD BOLT & NUT
181	1/2"x1" HEX HEAD BOLT & NUT
35	1/2" L WELDED BOLT & HEX NUT
150	3/8"x1 1/2" HEX HEAD CONE POINT BOLT
23	3/8"x 1/2" HEX HEAD TAP BOLT
92	1/2" LOCKWASHERS
480	3/8" PLAIN WASHERS
7	1/4" F.H. BRASS SCREWS WITH EXPANSION UNIT
7	1/4"-20 x 5/8" FLAT HEAD MACHINE SCREW
300	#8 x 7/8" R.H. STSM SCREW
235	#8 x 3/4" R.H. STSM SCREW
1	LEFT HAND DOOR STOP & HOLDER
1	RIGHT HAND DOOR STOP & HOLDER
9	1/4"-20 x 1/2" R.H. MACHINE SCREWS
4500	INSULATION, EXCLUDING PANELS (CU. IN.)
10	ELASTIC CAULKING COMPOUND (GALLONS)

BOLTS FOR INSTALLING TYPE "TT" AIR FILTER

No. REQ.	DESCRIPTION
7	1/4" x 2 1/2" FLAT HEAD STOVE BOLTS
5	#8 x 3/4" FLAT HEAD SHEET METAL SCREWS
18	1/4"-20 x 5/8" R.H. MACH. SCREWS & HEX NUTS
18	1/4" LOCKWASHERS
2	1/4" x 2 1/2" CARRIAGE BOLTS

No.	REVISIONS	DATE	CHECKED
1	CHANGED PANELS	10-17-52	HK

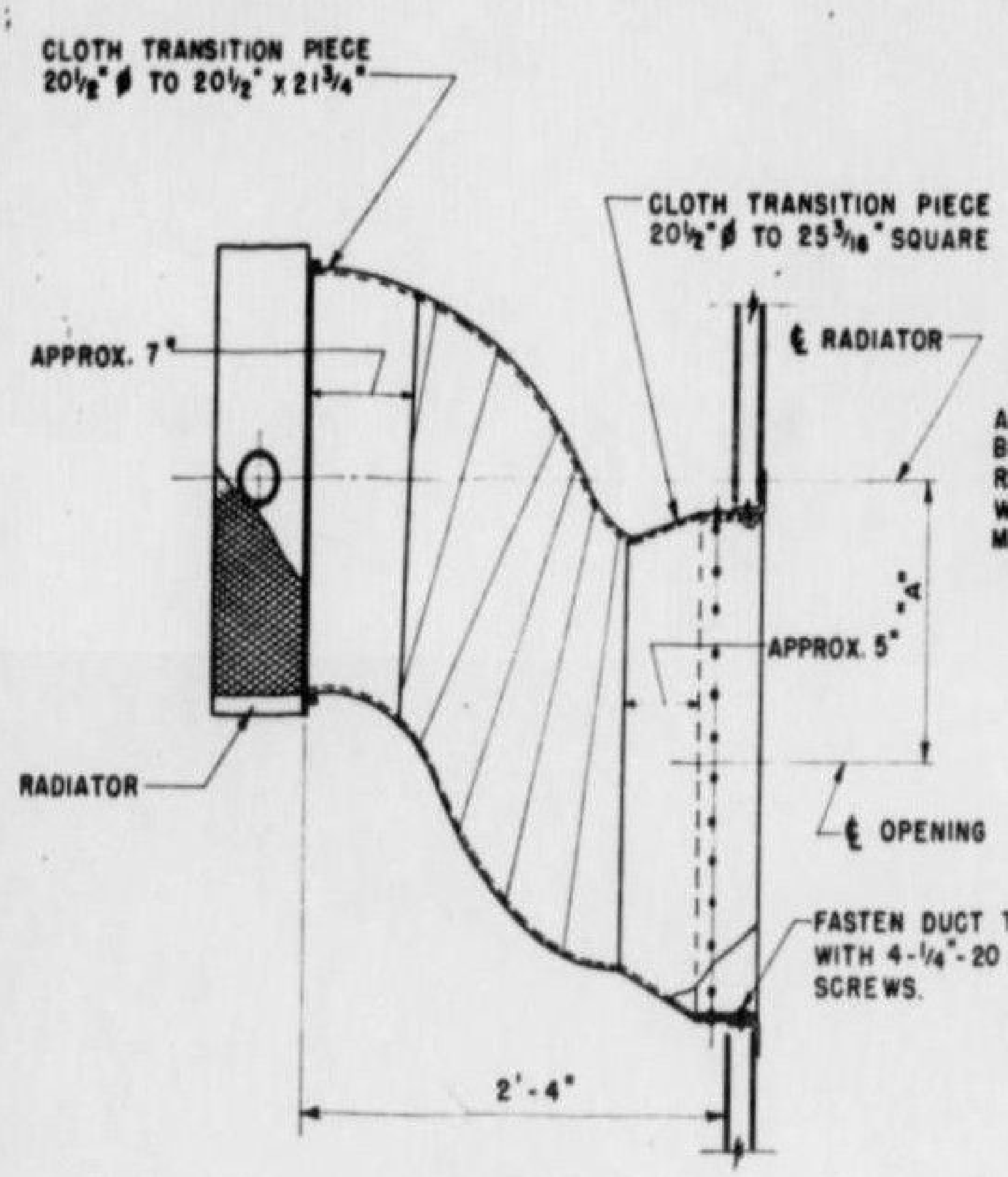
REVIEWED BY:
RJ ELECTRONICS
PDB AUX. EQUIPT.
CBW STRUCT. MAT'LS.

CIVIL AERONAUTICS ADMINISTRATION
OFFICE OF FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

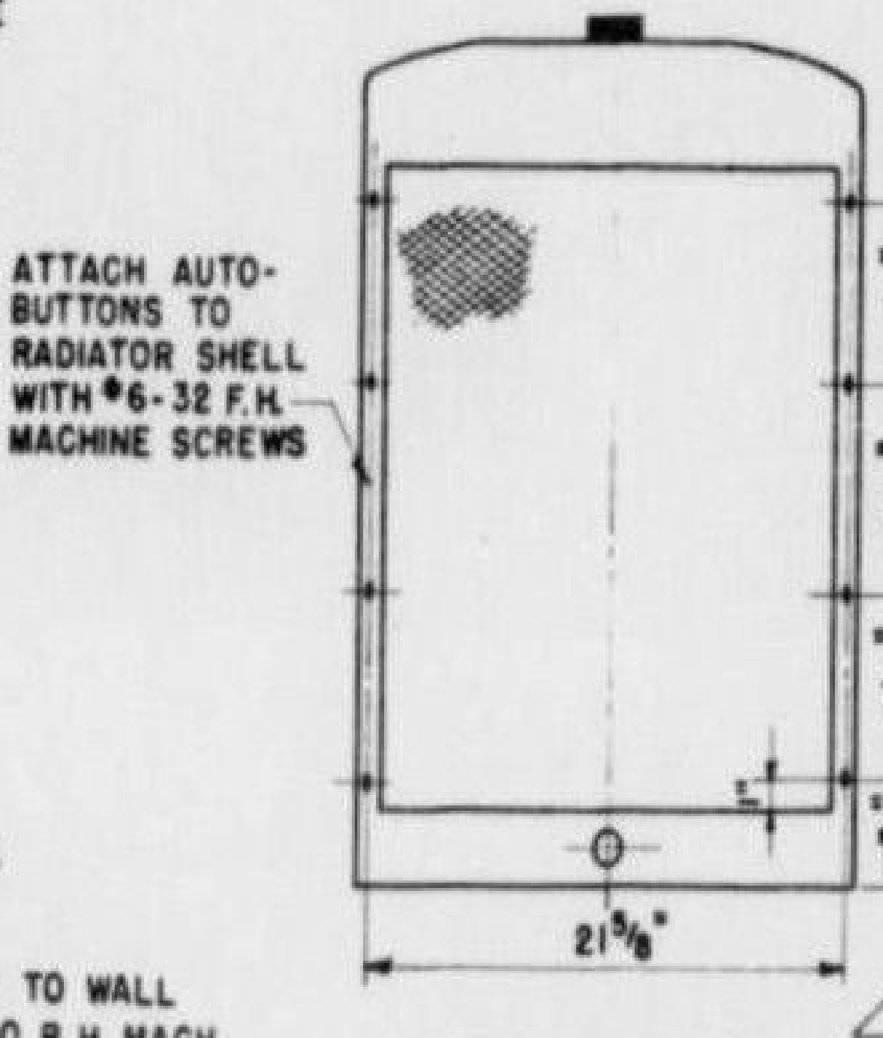
"MOUNTAIN TOP" VOR
16'x28' TYPE "5" BLDG.
PLANS & ELEVATIONS

DESIGNED · DRAWN · TRACED · CHECKED
SUBMITTED BY: Frank H. Cosgrove
CHIEF, DESIGN AND SPECIFICATION SECTION
APPROVED BY:
CHIEF, STRUCTURES AND LTG. ESTAB. BR.
DATE 4-10-51
DR. D-1701-2AL

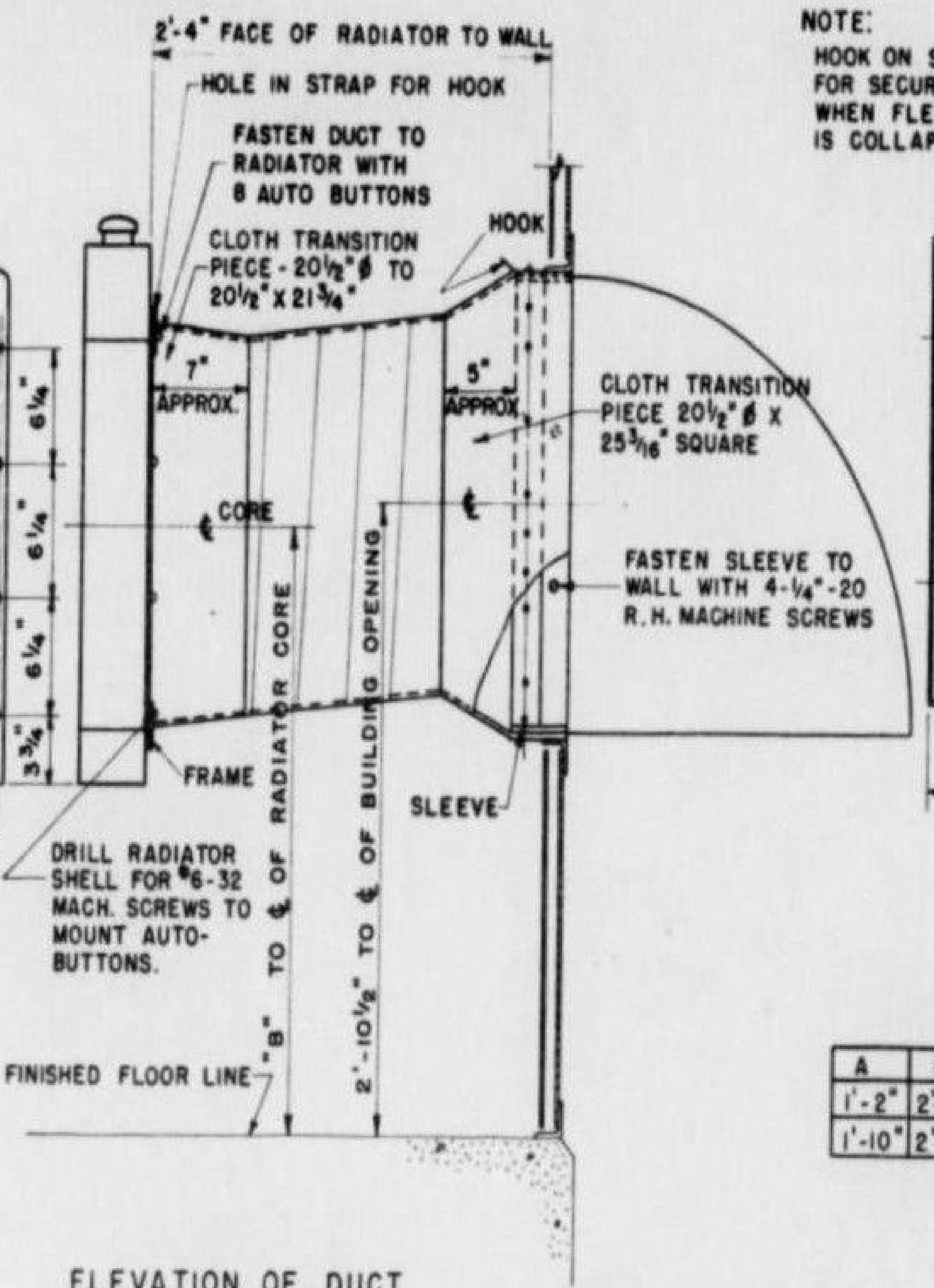
MOUNTAIN TOP SITE


CLOTH TRANSITION PIECE 20 1/2" ∅ TO 20 1/2" X 21 3/4"
CLOTH TRANSITION PIECE 20 1/2" ∅ TO 25 3/16" SQUARE
APPROX. 7"
℄ RADIATOR
"A"
APPROX. 5"
RADIATOR
℄ OPENING
FASTEN DUCT TO WALL WITH 4-1/4"-20 R.H. MACH. SCREWS.
2'-4"

PLAN

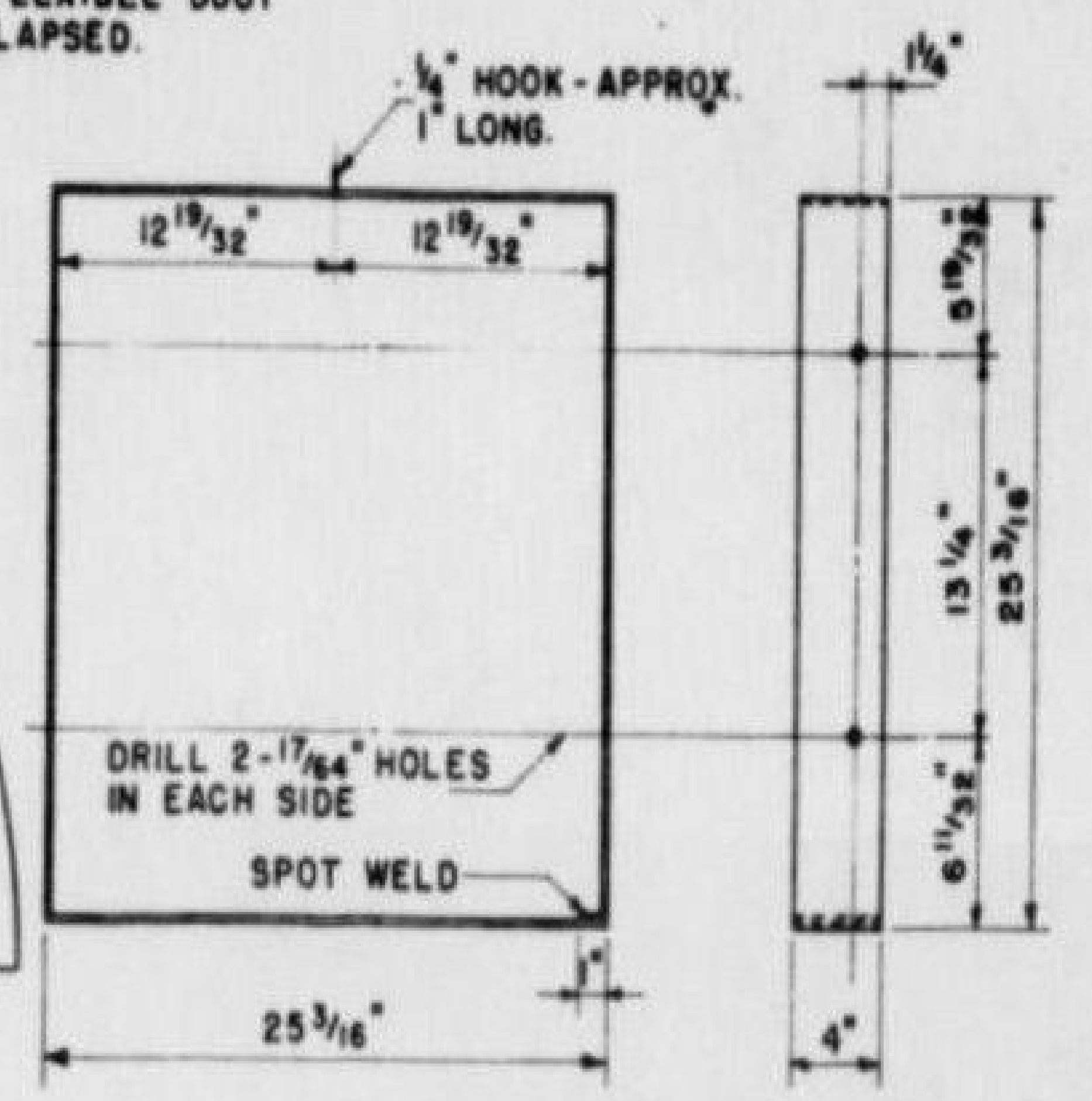

ATTACH AUTO-BUTTONS TO RADIATOR SHELL WITH #6-32 F.H. MACHINE SCREWS
6 1/4"
6 1/4"
6 1/4"
3 3/4"
1"
21 5/8"

RADIATOR FRONT


2'-4" FACE OF RADIATOR TO WALL
HOLE IN STRAP FOR HOOK
FASTEN DUCT TO RADIATOR WITH 8 AUTO BUTTONS
CLOTH TRANSITION PIECE - 20 1/2" ∅ TO 20 1/2" X 21 3/4"
HOOK
7" APPROX.
5" APPROX.
CLOTH TRANSITION PIECE 20 1/2" ∅ X 25 3/16" SQUARE
℄ CORE
"B" TO ℄ OF RADIATOR CORE
2'-10 1/2" TO ℄ OF BUILDING OPENING
FASTEN SLEEVE TO WALL WITH 4-1/4"-20 R.H. MACHINE SCREWS
FRAME
SLEEVE
DRILL RADIATOR SHELL FOR #6-32 MACH. SCREWS TO MOUNT AUTO-BUTTONS.
FINISHED FLOOR LINE

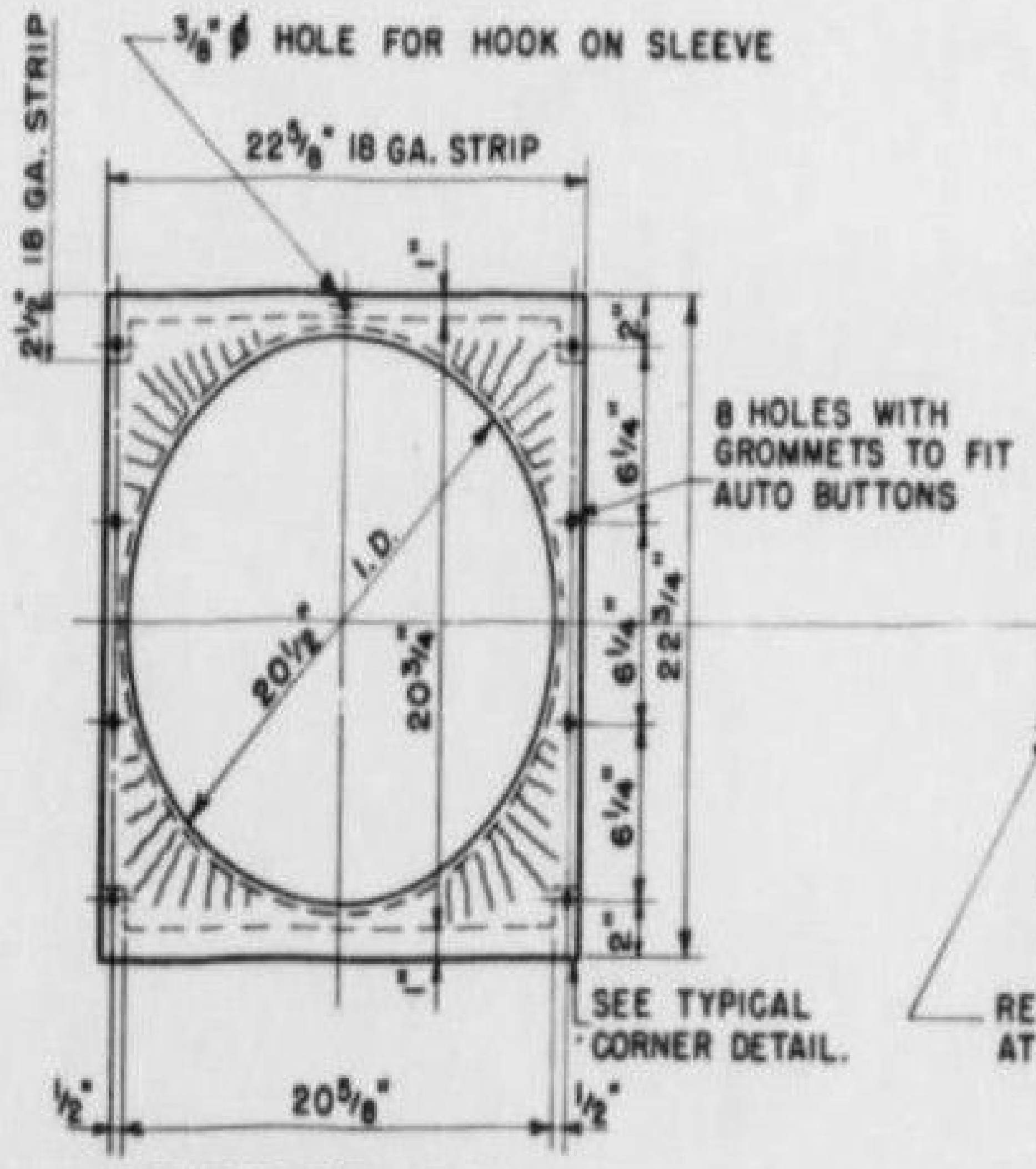
ELEVATION OF DUCT AS INSTALLED

NOTE: HOOK ON SLEEVE USED FOR SECURING FRAME WHEN FLEXIBLE DUCT IS COLLAPSED.

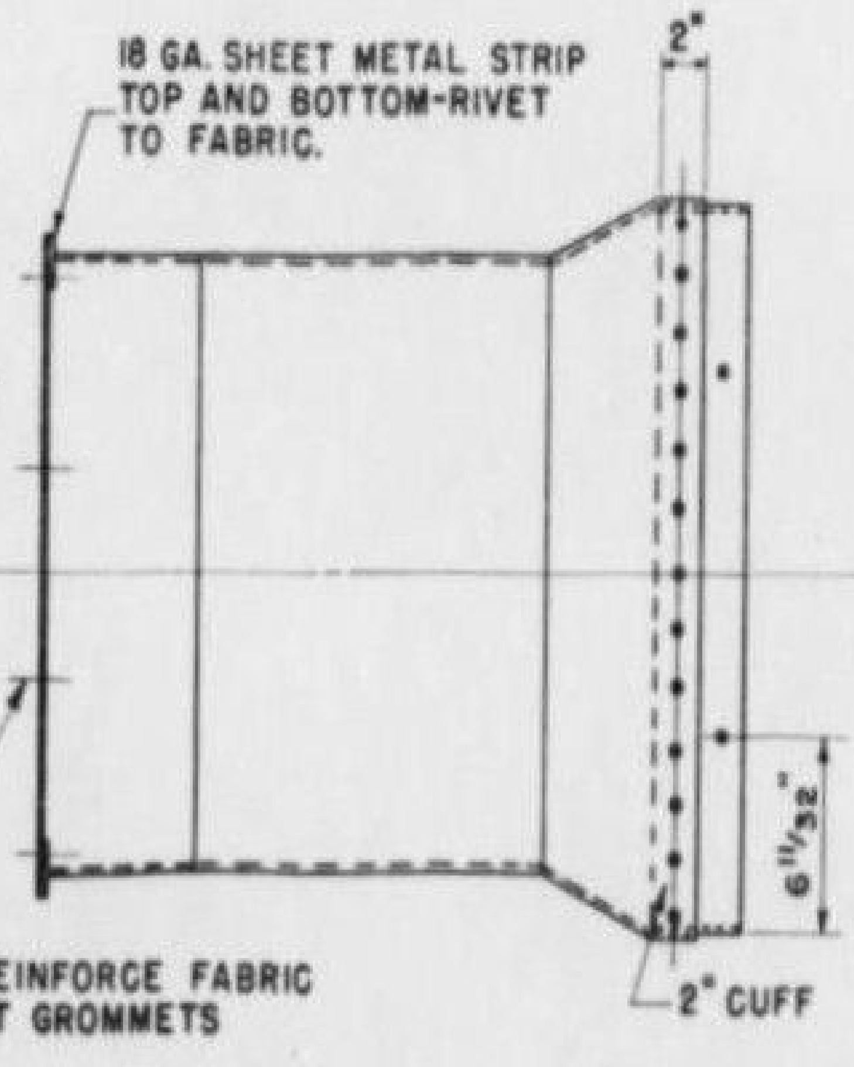


SLEEVE
(AT WALL PANEL)
#18 GA. SHEET STEEL

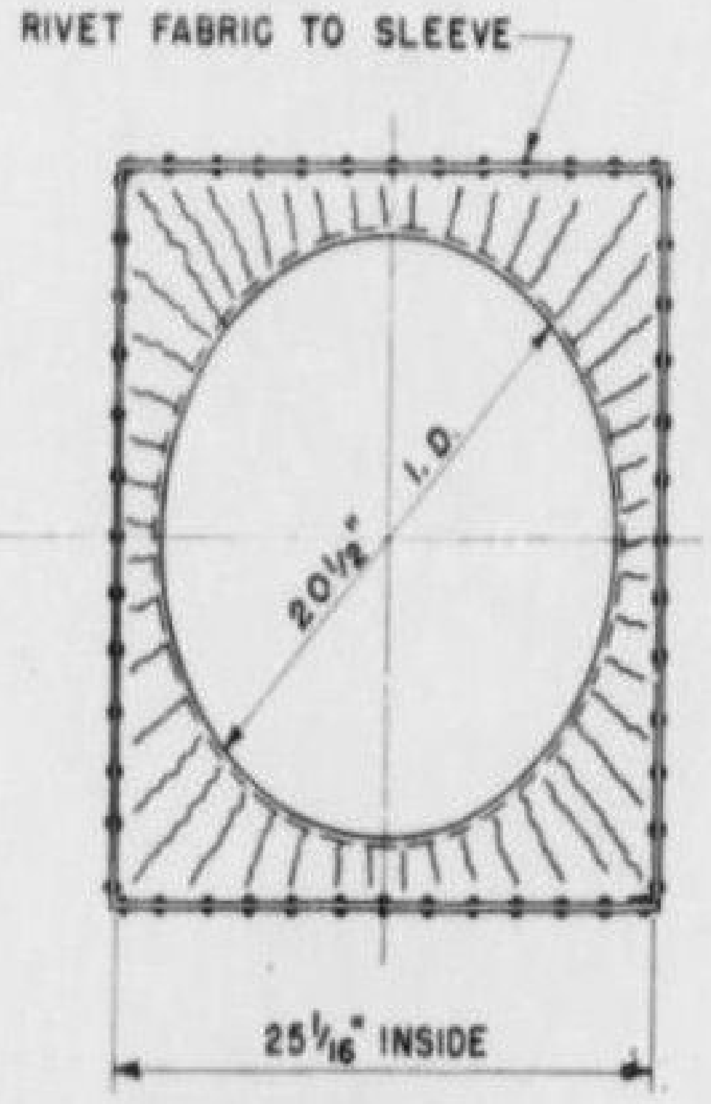
A	B	
1'-2"	2'-8 1/2"	FOR 8 KVA ENGINE PER DWGS. D-3317-4, 13, 28, 29 & 36
1'-10"	2'-7 3/8"	FOR 9.4 KVA ENGINE PER DWG. D-3317-14



RADIATOR END


18 GA. SHEET METAL STRIP TOP AND BOTTOM-RIVET TO FABRIC.
2"
6 11/32"
REINFORCE FABRIC AT GROMMETS
2" CUFF

SIDE VIEW

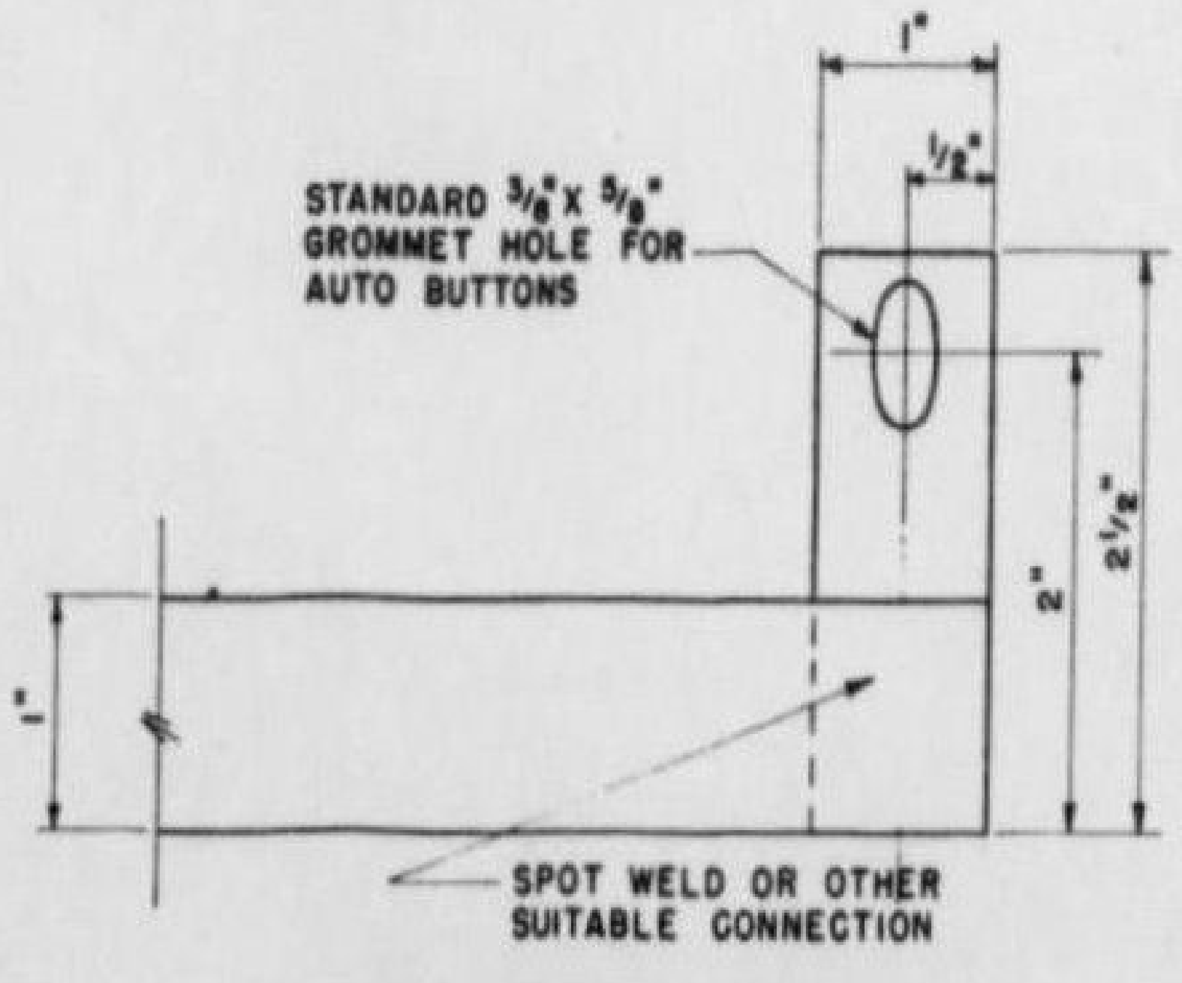


BUILDING END

FLEXIBLE DUCT

NOTES

1. ALL STEEL TO BE GALVANIZED.
2. 8-AUTO BUTTONS AND 16 #6-32 X 1/2" F.H. MACHINE SCREWS WITH LOCKWASHERS AND NUTS TO BE FURNISHED WITH EACH DUCT.
3. 4-1/4"-20 X 1/2" R.H. MACHINE SCREWS TO BE FURNISHED WITH EACH SLEEVE.
4. THE FLEXIBLE DUCT SHALL CONSIST OF A RUSTPROOF SELF-RETRACTING SPRING WIRE SPIRAL FRAME COVERED WITH A NEOPRENE COATED FIBER GLASS CLOTH, OLIVE DRAB COLOR.
5. THIS DUCT MAY BE MOUNTED ON RADIATORS SHOWN ON DUPLEX TRUCK CO'S. DRAWINGS D9165 OR D10007.
6. WHEN DUCT IS INSTALLED ON RADIATOR (D9165) WITH EXPANSION TANK, IT WILL BE NECESSARY TO REMOVE THE ROUND HEAD SCREW IN THE LOWER RIGHT TANK-BAND, COUNTERSINK THE HOLE AND FURNISH A FLAT HEAD SCREW. THIS WILL PRESENT A FLAT SURFACE FOR MOUNTING THE AUTO BUTTON.


1"
1/2"
STANDARD 3/8" X 5/8" GROMMET HOLE FOR AUTO BUTTONS
2 1/2"
2"
1"
SPOT WELD OR OTHER SUITABLE CONNECTION

TYPICAL CORNER DETAIL

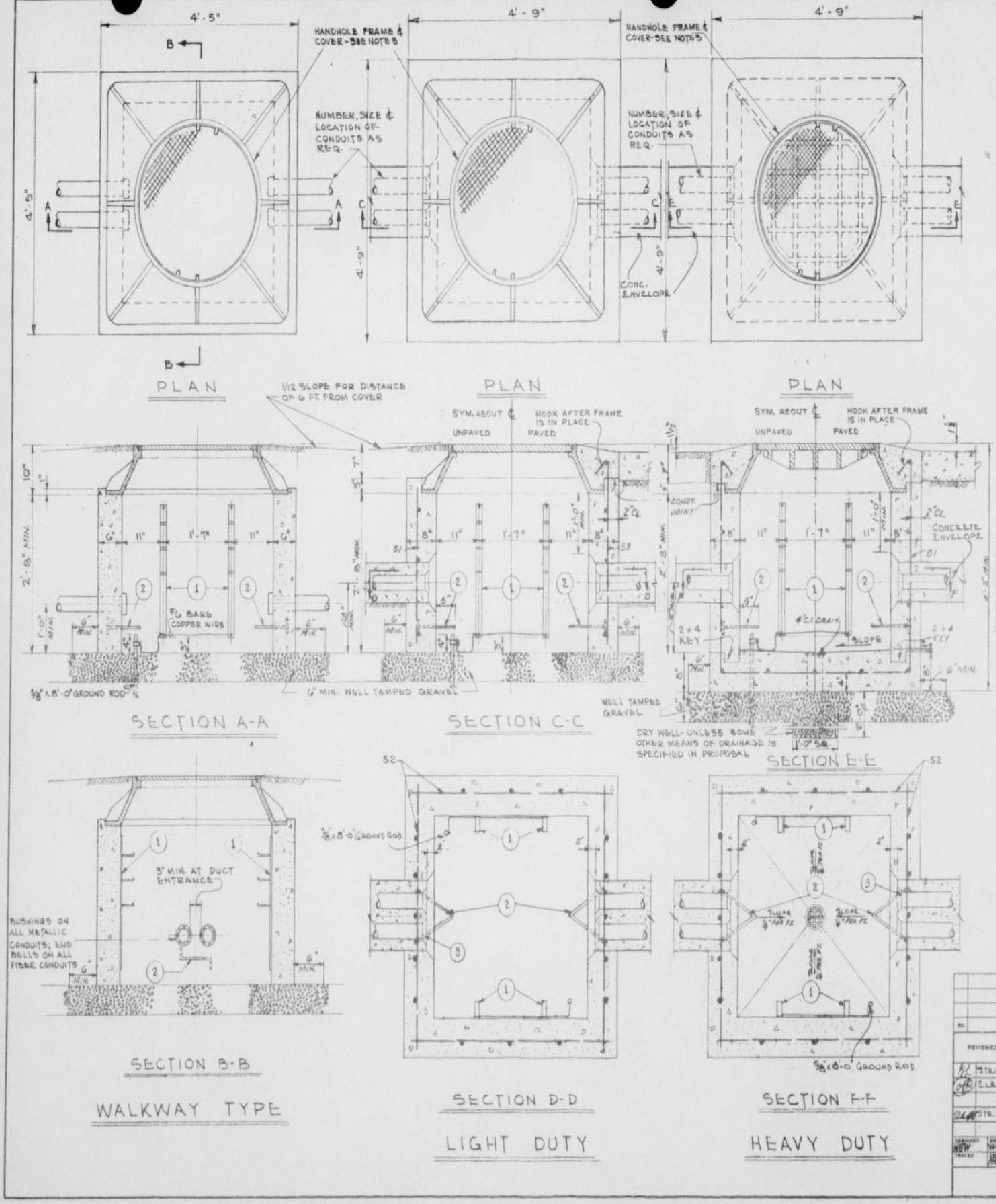
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

FLEXIBLE AIR DUCT
FOR DUPLEX 8 & 9.4 KVA ENGINE GENERATOR
ASSEMBLY AND DETAILS

APPROVED: H. Sklar for R.J. ALPHER
CHIEF-STRUC. AND LTS. ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
CHECKED: JW
DESIGNED:
DRAWN: D.T.
TRACED: A.C.W.
DATE: 12-10-51
DR. D-4794-1

NO.	REVISION	DATE	CHECKED

22217



LEGEND

1. CABLE RACKS-JOSLYN #J-5126 OR EQUAL. CABLE HOOKS-JOSLYN #J-5131 OR EQUAL. LOCATION & NUMBER MAY BE VARIED TO SUIT LOCAL CONDITIONS.
2. PULLING-IN-IRONS - INSTALL OPPOSITE CONDUIT ENTRANCE. POSITION BELOW LEVEL OF CONDUIT ENTRANCE. HUBBARD & CO. NO. 9119 OR EQUAL.
3. TERMINATE ALL DUCTS IN LIGHT AND HEAVY DUTY HANDHOLES WITH END BELLS.

NOTES:

HANDHOLE FRAME & COVER, FLOCKHART FOUNDRY CO. OR EQUAL
WALKWAY TYPE - TYPE 615-B, #60891
LIGHT DUTY - TYPE 615-B, #60885-CAPACITY 60 K.L.
HEAVY DUTY - TYPE "B", #25897-CAPACITY 110 K.L.

WALKWAY TYPE HANDHOLE TO BE INSTALLED ONLY IN AREAS NOT SUBJECT TO VEHICULAR OR AIRCRAFT LOADS.

INDICATED DEPTH OF HOLE MAY BE EXCEEDED WHEN NECESSARY.

DIAMETER OF HANDHOLE CLEAR OPENING IS 30".

CASTING TO BE MADE OF GRAY CAST IRON CLASS 30 IN ACCORDANCE WITH FED. SPEC. QQ-I-652.

REINFORCING SCHEDULE

	MARK	AMOUNT	SIZE	LENGTH	DETAIL
LIGHT DUTY UNPAVED	S1 S2	16 12	[illegible] [illegible]	2'-9" 8'-8"	
LIGHT DUTY PAVED	S3 S4	16 16	[illegible] [illegible]	[illegible] [illegible]	
HEAVY DUTY PAVED AND UNPAVED	S2 B1	16 4	[illegible] [illegible]	8'-6" 12'-0"	[illegible]

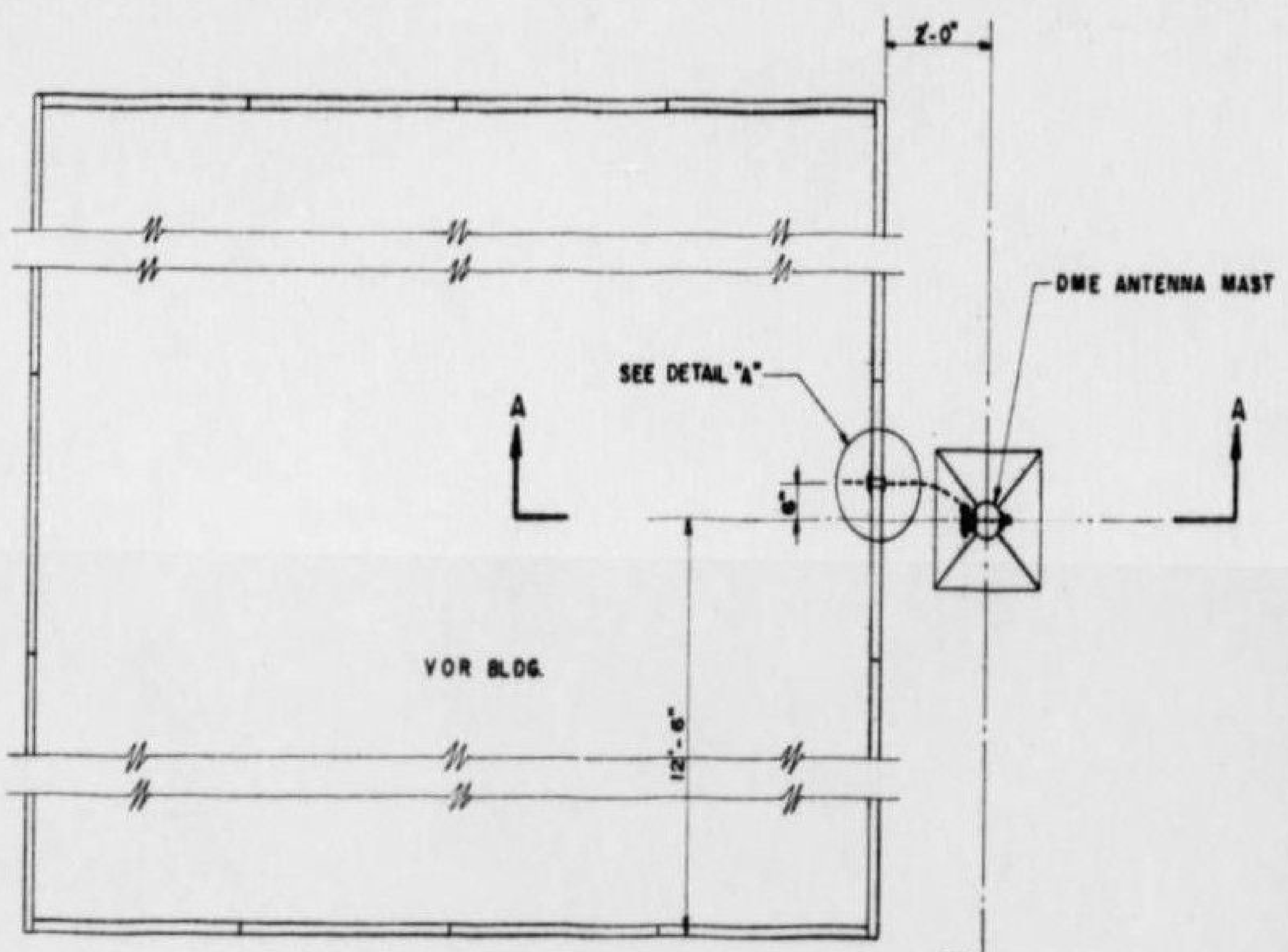
NO.	REVISIONS	DATE	CHECKED

REVIEWED BY:
STRUCT.
ELECT.
STD. MAT'L.

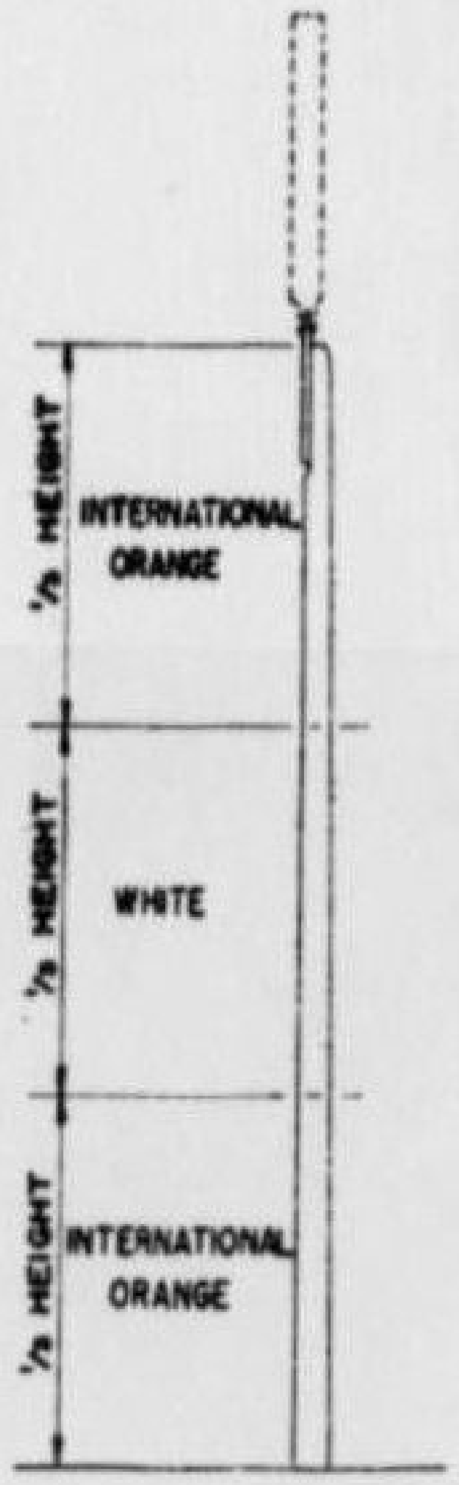
CIVIL AERONAUTICS ADMINISTRATION
OFFICE OF FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

STANDARD UNDERGROUND HANDHOLES
CONSTRUCTION DETAILS

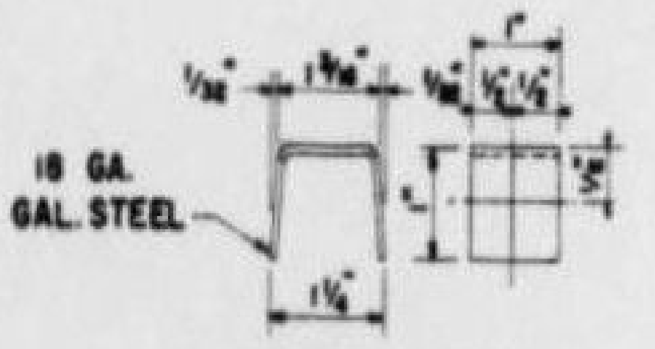
DESIGNED HEW
DRAWN WHITE
TRACED
CHECKED HEW
SUBMITTED BY: H. F. Hollis
CHIEF, DESIGN AND SPECIFICATION SECTION
APPROVED BY: R. J. ALPHER
CHIEF, STRUCTURES AND LTG. DETAIL BR.
DATE 10-7-52
DR. D-4863-1



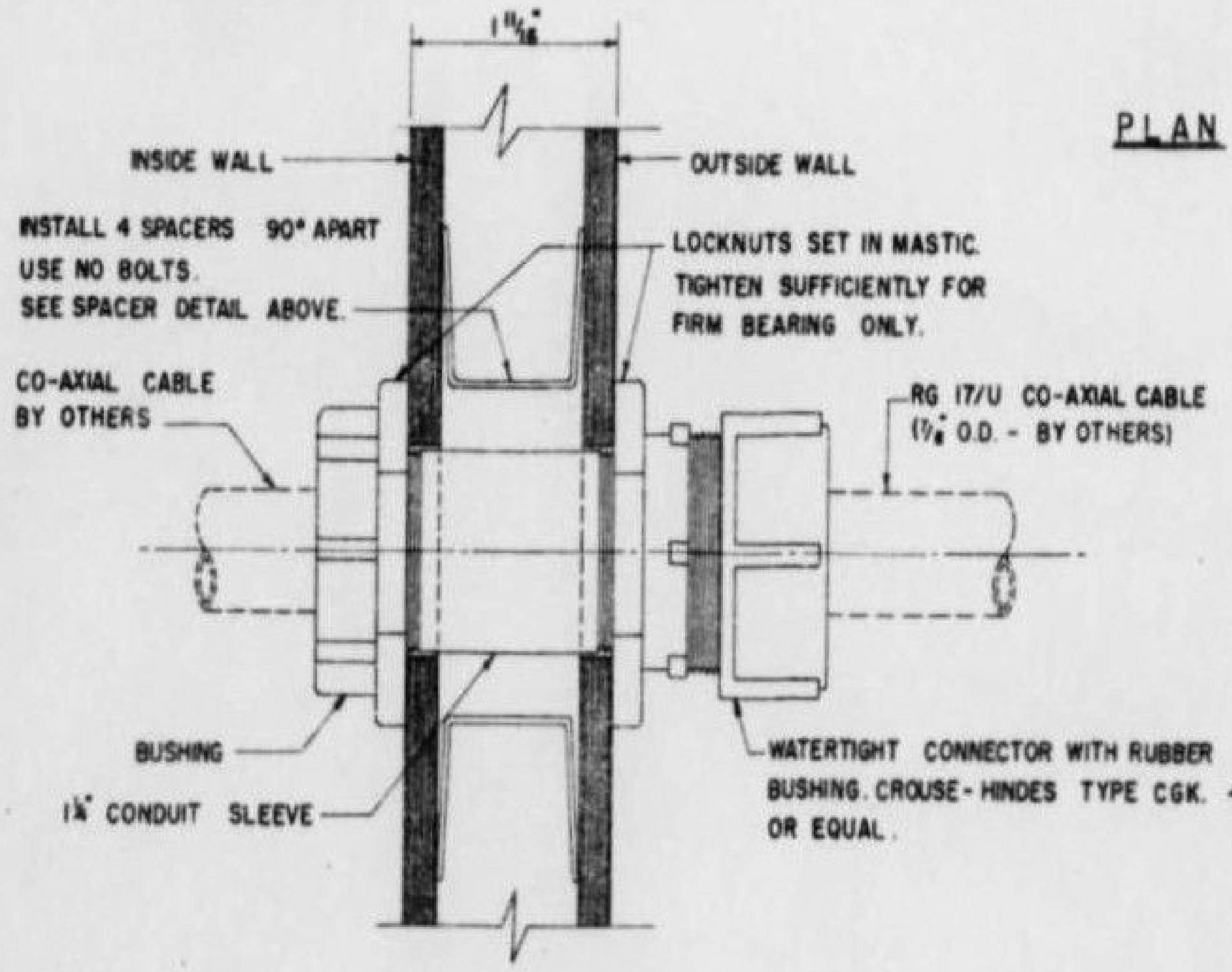
PLAN



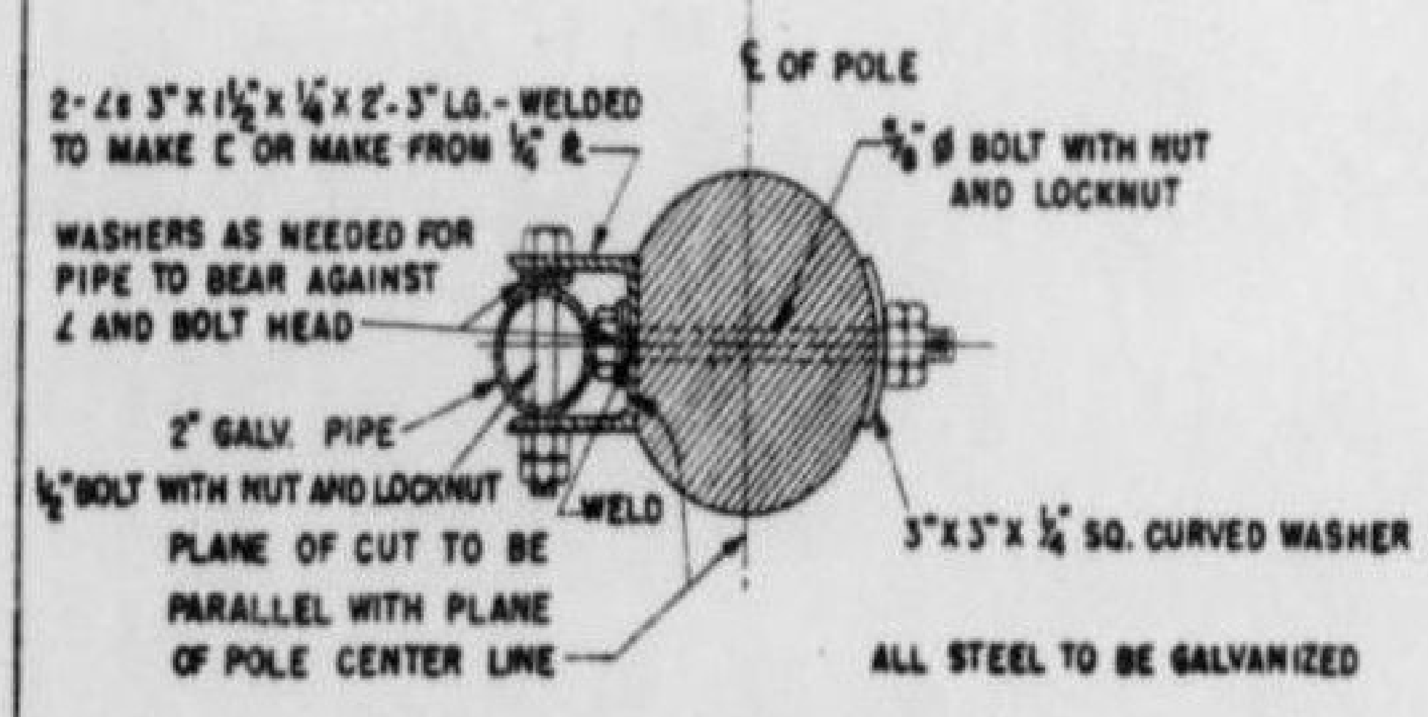
DETAIL "C"
PAINTING OF POLE



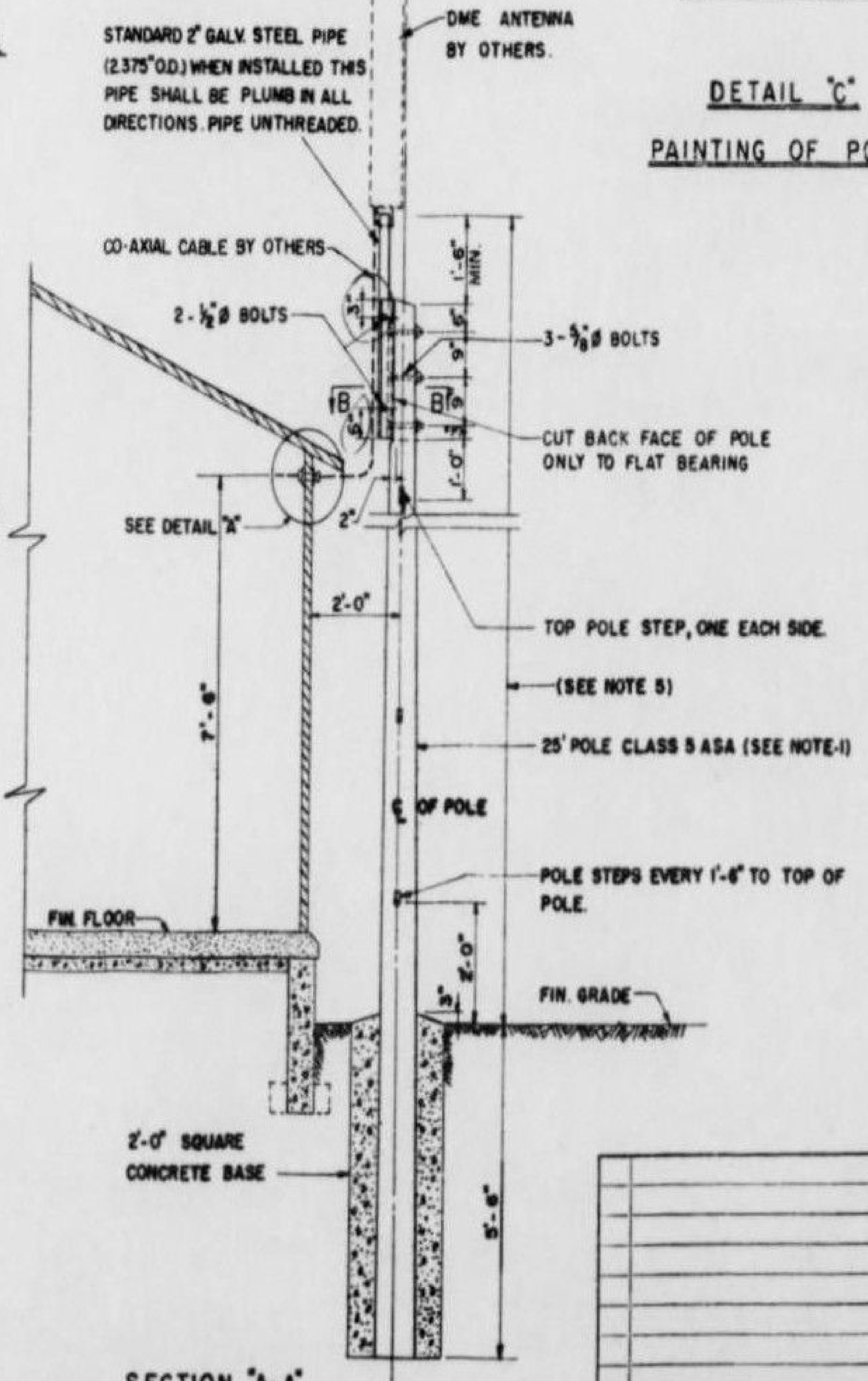
SPACER DETAIL


1 11/16"
INSIDE WALL
OUTSIDE WALL
INSTALL 4 SPACERS 90° APART USE NO BOLTS. SEE SPACER DETAIL ABOVE.
LOCKNUTS SET IN MASTIC. TIGHTEN SUFFICIENTLY FOR FIRM BEARING ONLY.
CO-AXIAL CABLE BY OTHERS
RG 17/U CO-AXIAL CABLE (7/8" O.D. - BY OTHERS)
BUSHING
1¼" CONDUIT SLEEVE
WATERTIGHT CONNECTOR WITH RUBBER BUSHING. CROUSE-HINDES TYPE CGK. OR EQUAL.

DETAIL "A"


℄ OF POLE
2-∠s 3"×1½"×¼"×2'-3" LG.- WELDED TO MAKE [OR MAKE FROM ¼" ℞
⅝"Ø BOLT WITH NUT AND LOCKNUT
WASHERS AS NEEDED FOR PIPE TO BEAR AGAINST ∠ AND BOLT HEAD
2" GALV. PIPE
½" BOLT WITH NUT AND LOCKNUT
WELD
PLANE OF CUT TO BE PARALLEL WITH PLANE OF POLE CENTER LINE
3"×3"×¼" SQ. CURVED WASHER
ALL STEEL TO BE GALVANIZED

SECTION "B-B"


STANDARD 2" GALV. STEEL PIPE (2.375" O.D.) WHEN INSTALLED THIS PIPE SHALL BE PLUMB IN ALL DIRECTIONS. PIPE UNTHREADED.
DME ANTENNA BY OTHERS.
CO-AXIAL CABLE BY OTHERS
1'-6" MIN.
2-½"Ø BOLTS
3-⅝"Ø BOLTS
B
B
CUT BACK FACE OF POLE ONLY TO FLAT BEARING
1'-0"
SEE DETAIL "A"
2"
2'-0"
TOP POLE STEP, ONE EACH SIDE.
(SEE NOTE 5)
7'-6"
25' POLE CLASS 5 ASA (SEE NOTE-1)
℄ OF POLE
POLE STEPS EVERY 1'-6" TO TOP OF POLE.
FIN. FLOOR
2'-0"
FIN. GRADE
2'-0" SQUARE CONCRETE BASE
5'-6"

SECTION "A-A"

NOTES

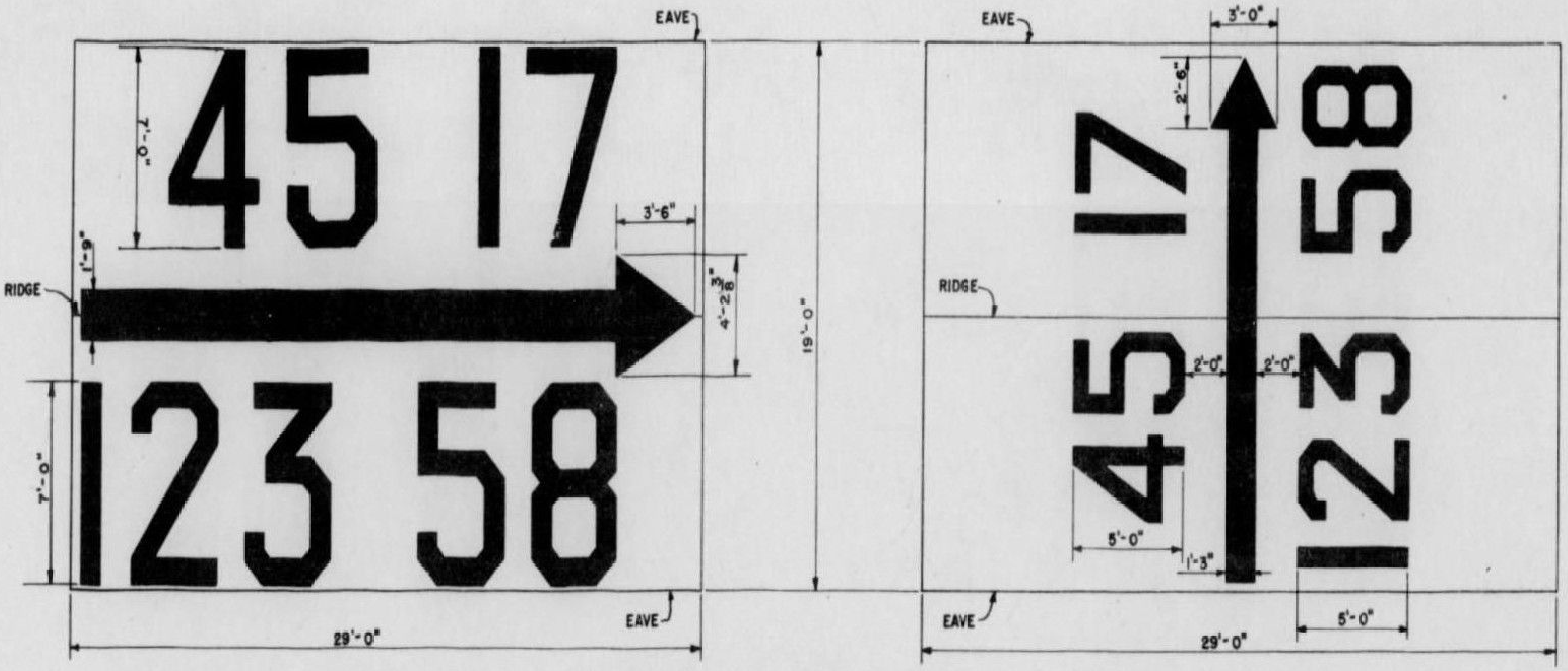
1. ANTENNA POLE SHALL BE SOUTHERN PINE OR DOUGLAS FIR, STRAIGHT. AND FREE FROM DEFECTS. POLE SHALL BE IN ACCORDANCE WITH SPEC. CAA-113 TYPE II PENTA-CHLOROPHENOL TREATED.
2. AXIS OF POLE TO BE WITHIN 3" OF VERTICAL ALIGNMENT AT TOP AND BOTTOM.
3. FOR ORIENTATION OF BUILDING AND MAST SEE PLOT LAYOUT DWG. NO D-2798-5A.
4. PROVIDE 10 ONE SCREW CABLE CLAMPS FOR ATTACHMENT OF 7/8" DIA. CO-AXIAL CABLE TO POLE. TIE TOGETHER AND SUSPEND FROM CONNECTOR IN DETAIL "A" FOR USE BY OTHERS.
5. BOTTOM OF DME ANTENNA TO BE 10'-7" ABOVE FLOOR LINE OF GROUND MOUNTED VHF OMNIRANGE ANTENNA SHELTER.

NO.	REVISION	DATE	CHECKED
1	REVISED ANTENNA MOUNTING,	4-1-53	

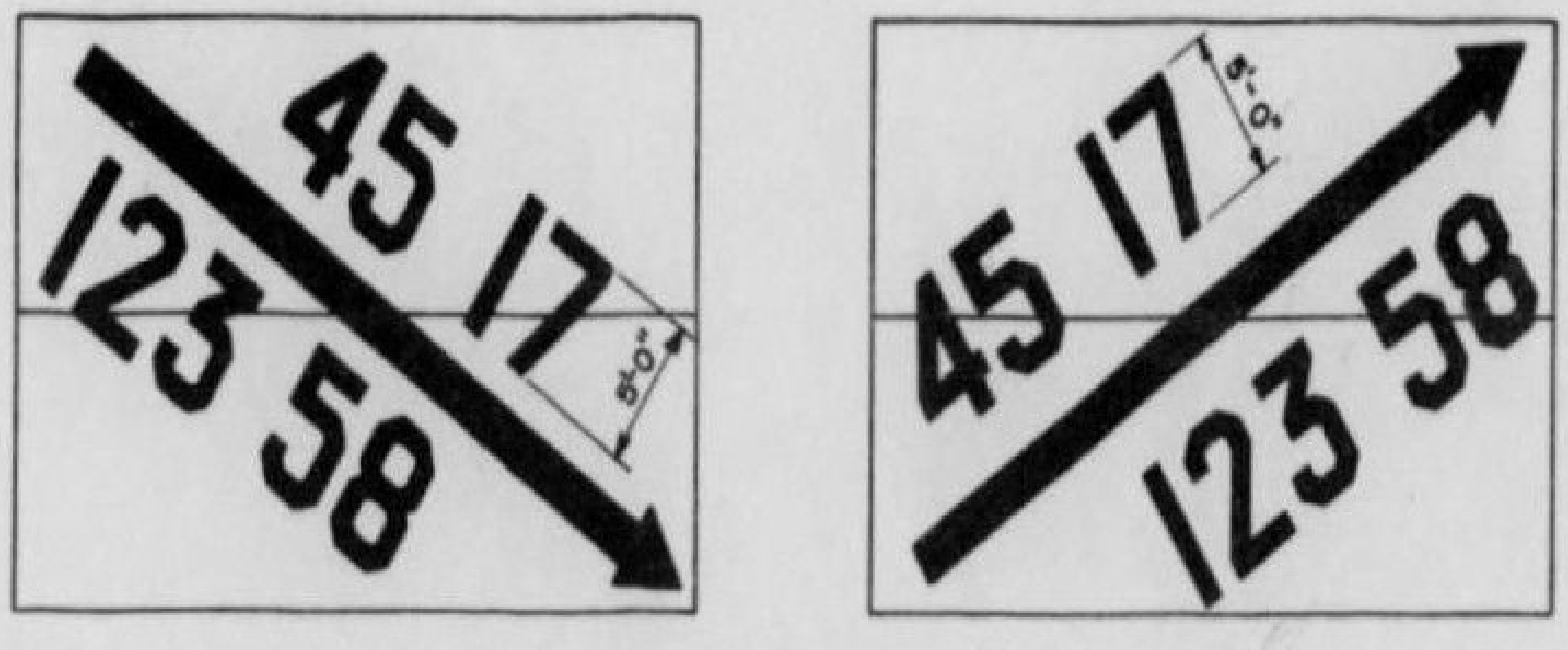
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

MOUNTAIN TOP VOR
DME ANTENNA MAST
INSTALLATION

APPROVED: Frank H Cosgrove
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: H Steen
CHIEF OF SECTION
CHECKED: OLB
DESIGNED: H
DRAWN: H.N.
TRACED: C.H.H.
DATE: 5-24-49
DR. D-4686-S



ROOF PLAN FOR 16' X 28' BLD'G.
SAME SIZE NUMERALS FOR 16' X 36'



EXAMPLES

NOTES÷

1. SEE DRAWING NO. C-4508 FOR DESIGN OF NUMERALS.

2. PAINT TRUE NORTH ARROW WITH LATITUDE AND LONGITUDE TO NEAREST MINUTE. LATITUDE MUST BE ON WEST SIDE OF ARROW.

3. ROOF TO BE CHROME YELLOW WITH BLACK NUMERALS AND ARROW.

4. THIS LAYOUT IS APPLICABLE TO BUILDINGS LOCATED OVER 3 MILES FROM A TOWN OR WHERE WITHIN THREE MILES OF A TOWN WITH NAME DIFFERENT FROM STATION NAME. WHERE BUILDING IS WITHIN 3 MILES OF A TOWN OF THE SAME NAME, PAINT AIR MARKER IN ACCORDANCE WITH DWG. D-4324-61.

NO.	REVISION	DATE	CHECKED
3	CHANGED DWG. NO. IN NOTE ④	3-10-52	
2	HORIZONTAL NO'S. 45 17 REVERSED	4-13-51	
1	REVISED NOTES ① & ④	12-16-46	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

AIR MARKING LAYOUT
FOR
MT. TOP VOR TYPE "S" BUILDING

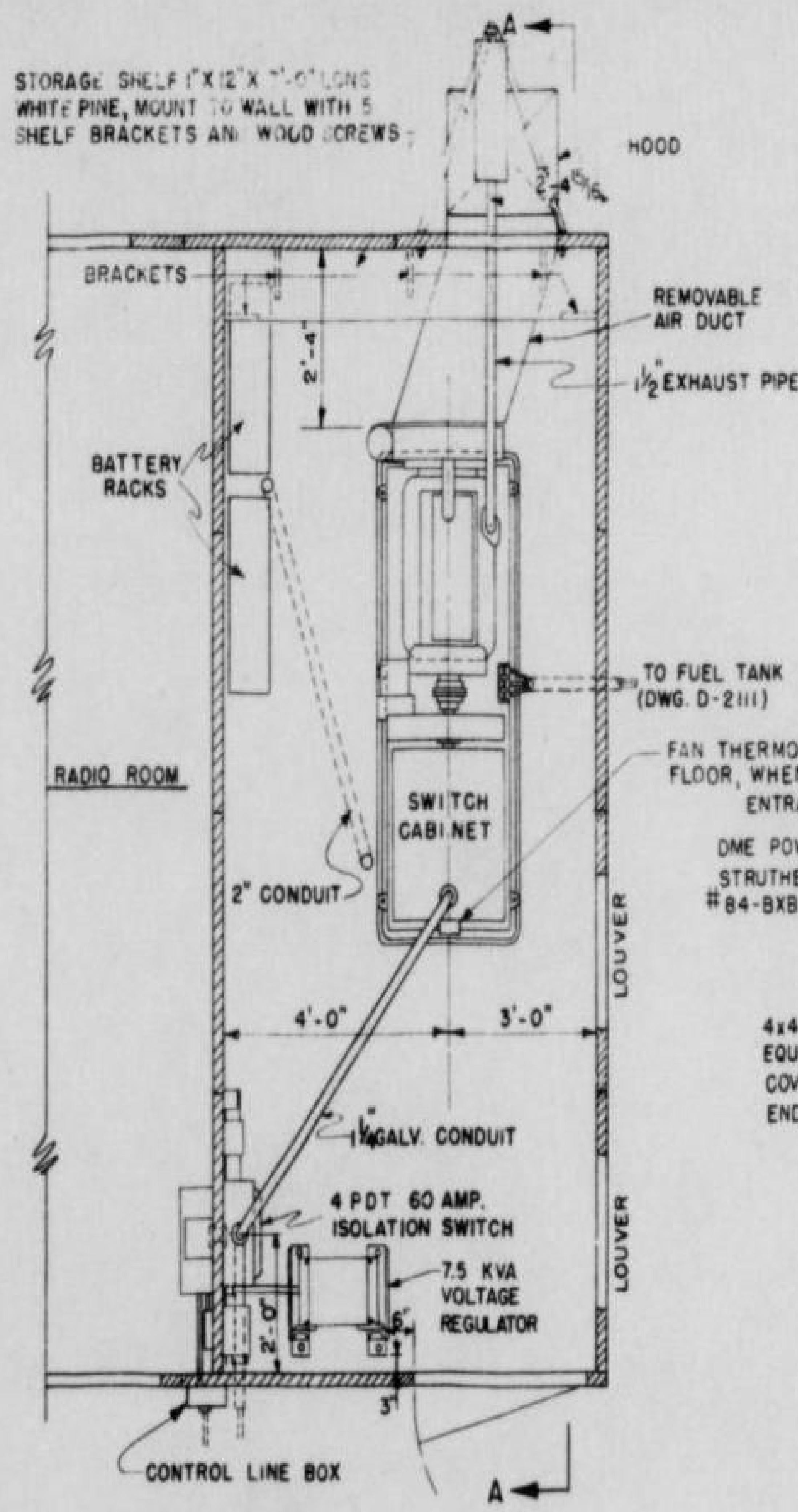
APPROVED: H. W. HOWARD
CHIEF: AIRWAYS ENGINEERING DIVISION

SUBMITTED BY: BLANCHE NOYES
Blanche Noyes
CHIEF OF SECTION

CHECKED BY:

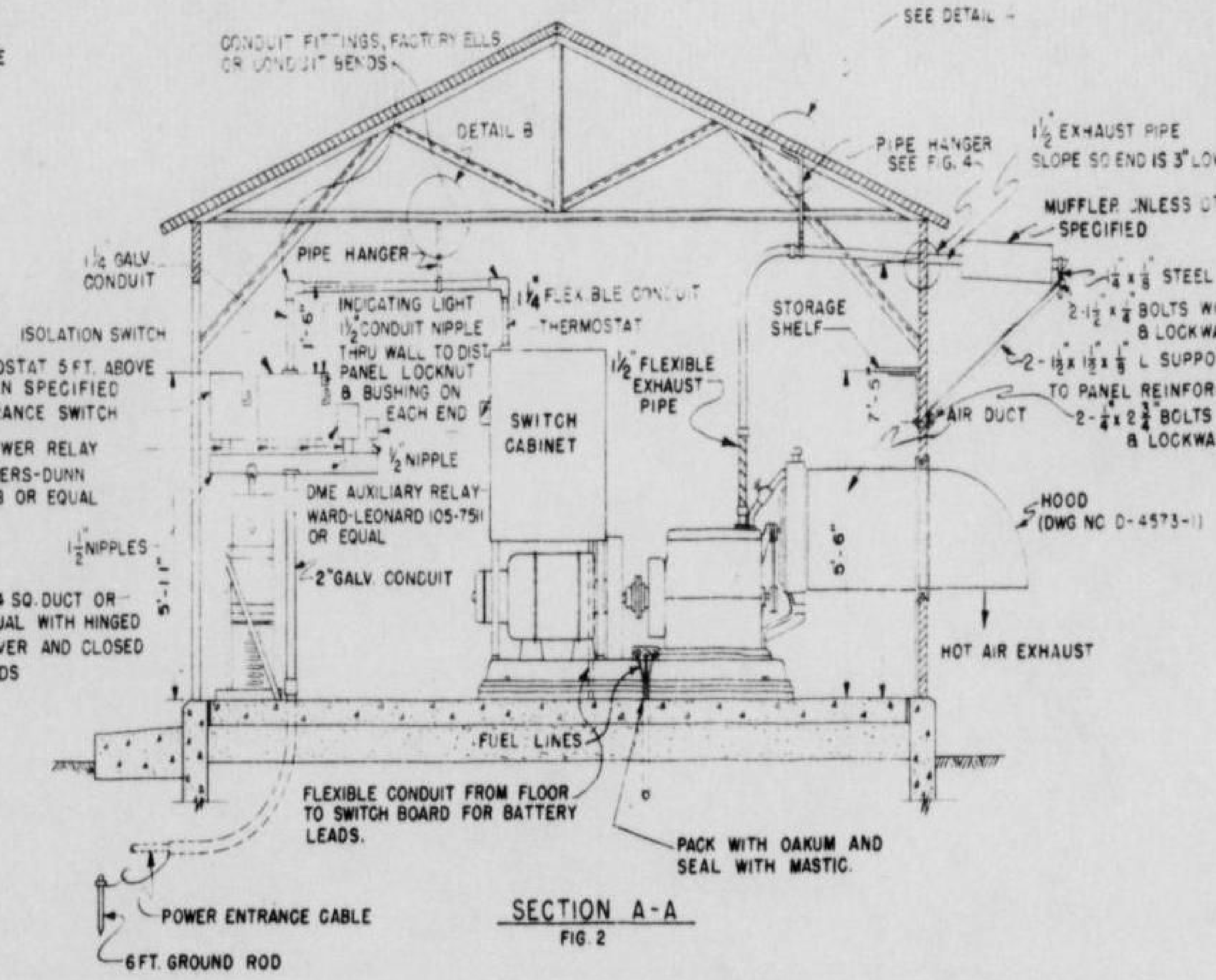
DRAWN BY: DOYLE
DATE 7-1-46

DR. C-4324-60


STORAGE SHELF 1" X 12" X 7'-0" LONG WHITE PINE, MOUNT TO WALL WITH 5 SHELF BRACKETS AND WOOD SCREWS
A
HOOD
BRACKETS
2'-4"
REMOVABLE AIR DUCT
1 1/2" EXHAUST PIPE
BATTERY RACKS
TO FUEL TANK (DWG. D-2111)
FAN THERMOSTAT 5 FT. ABOVE FLOOR, WHEN SPECIFIED
ENTRANCE SWITCH
RADIO ROOM
SWITCH CABINET
2" CONDUIT
4'-0"
3'-0"
LOUVER
LOUVER
1 1/4" GALV. CONDUIT
4 PDT 60 AMP. ISOLATION SWITCH
7.5 KVA VOLTAGE REGULATOR
3"
CONTROL LINE BOX
A

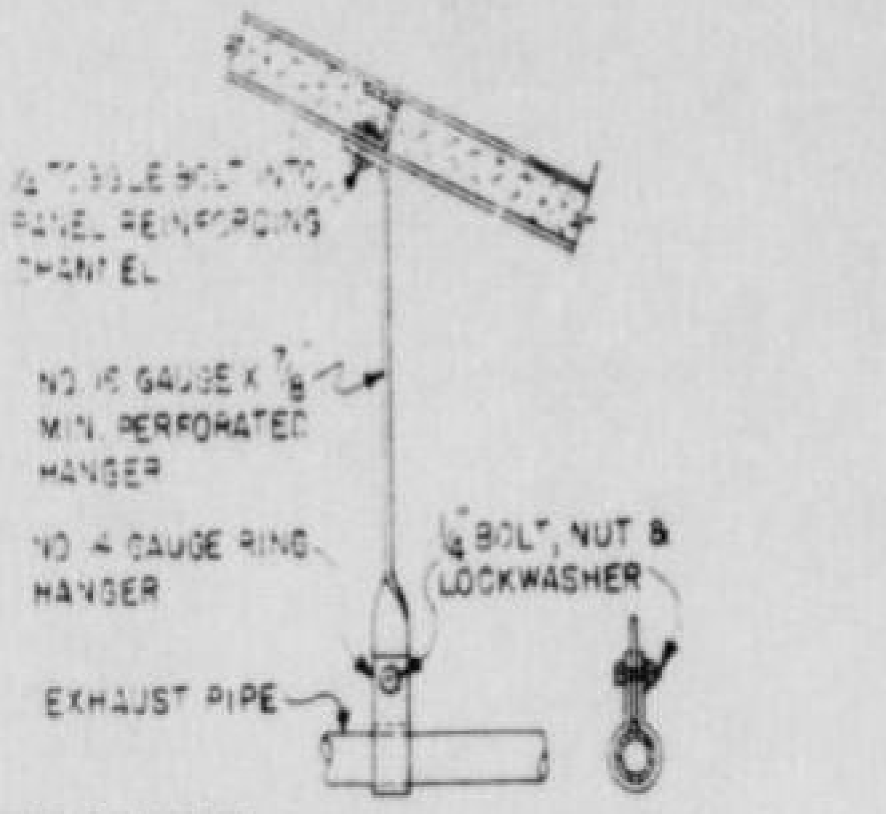
PLAN

FIG. 1


CONDUIT FITTINGS, FACTORY ELLS OR CONDUIT BENDS
SEE DETAIL A
DETAIL B
PIPE HANGER SEE FIG. 4
1 1/2" EXHAUST PIPE SLOPE SO END IS 3" LOWER THAN BEND.
MUFFLER UNLESS OTHERWISE SPECIFIED
1 1/4" GALV. CONDUIT
PIPE HANGER
1/4 x 1/8 STEEL STRAP
2-1/2 x 2 BOLTS WITH NUTS & LOCKWASHERS
2-1 1/2 x 1 1/2 x 1/8 L SUPPORT. ATTACH TO PANEL REINFORCING CHANNEL.
2-1/4 x 2 1/2 BOLTS WITH NUTS & LOCKWASHERS.
ISOLATION SWITCH
INDICATING LIGHT
1 1/2" CONDUIT NIPPLE THRU WALL TO DIST. PANEL LOCKNUT & BUSHING ON EACH END
1 1/4" FLEXIBLE CONDUIT
THERMOSTAT
STORAGE SHELF
1 1/2" FLEXIBLE EXHAUST PIPE
7'-5"
AIR DUCT
DME POWER RELAY STRUTHERS-DUNN #84-BXB OR EQUAL
1/2" NIPPLE
SWITCH CABINET
DME AUXILIARY RELAY WARD-LEONARD 105-751 OR EQUAL
HOOD (DWG NO. D-4573-1)
5'-6"
1 1/2" NIPPLES
2" GALV. CONDUIT
4x4 SQ. DUCT OR EQUAL WITH HINGED COVER AND CLOSED ENDS
5'-11"
HOT AIR EXHAUST
FUEL LINES
FLEXIBLE CONDUIT FROM FLOOR TO SWITCH BOARD FOR BATTERY LEADS.
PACK WITH OAKUM AND SEAL WITH MASTIC.
POWER ENTRANCE CABLE
6 FT. GROUND ROD

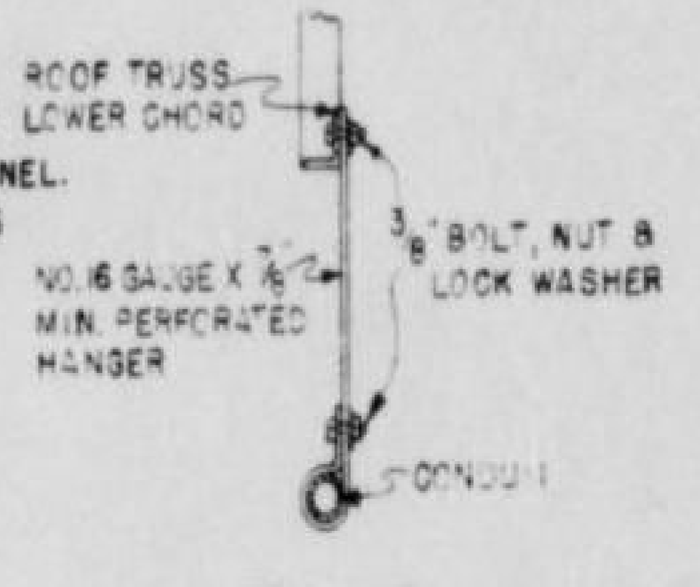
SECTION A-A

FIG. 2

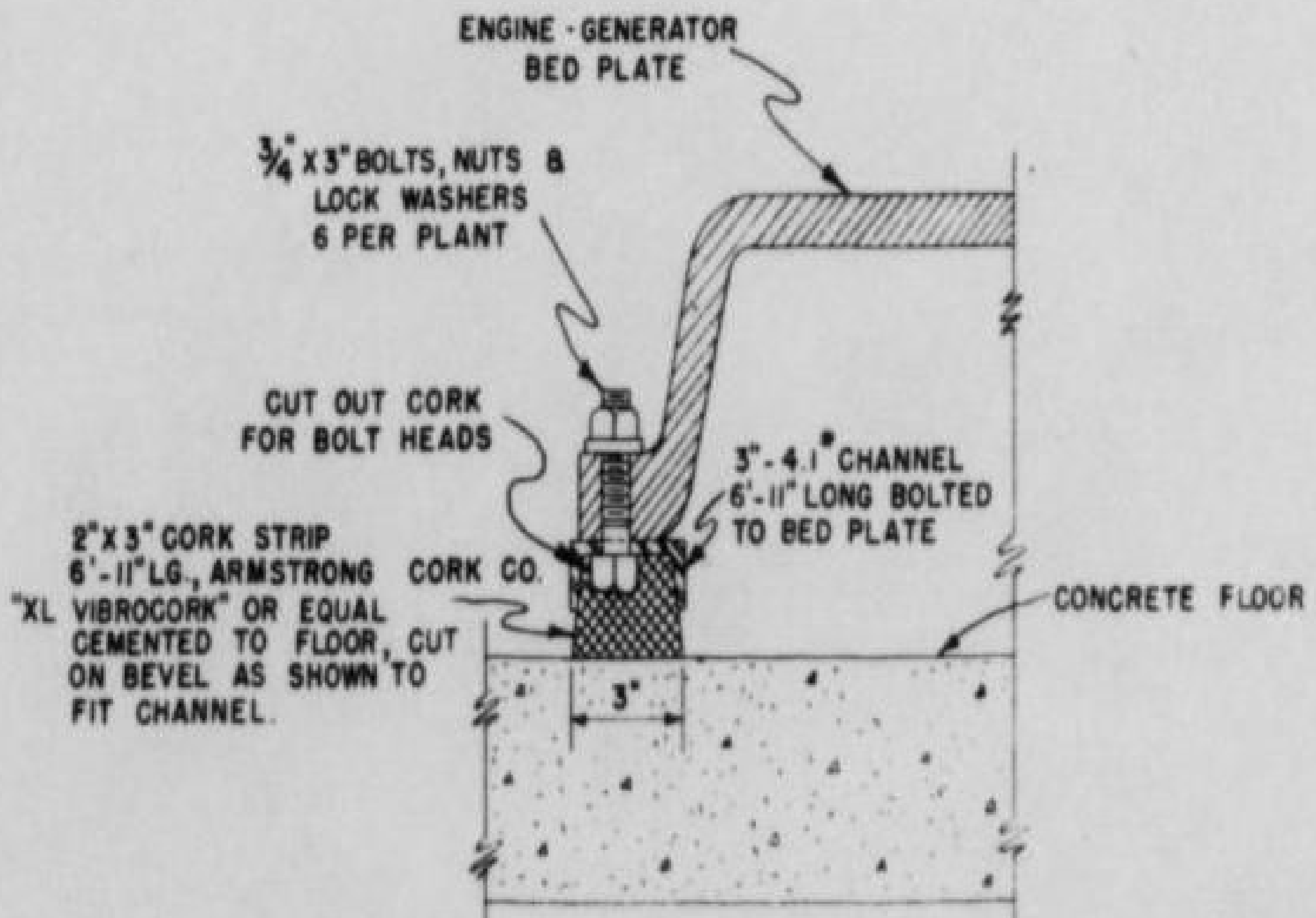

1/4 TOGGLE BOLT INTO PANEL REINFORCING CHANNEL
NO. 16 GAUGE X 7/8 MIN. PERFORATED HANGER
NO. 14 GAUGE RING HANGER
1/4 BOLT, NUT & LOCKWASHER
EXHAUST PIPE

DETAIL A

NO. 16 STEEL PERFORATED EXTENSION BAR WITH 2 PC. RING & BOLT HANGER

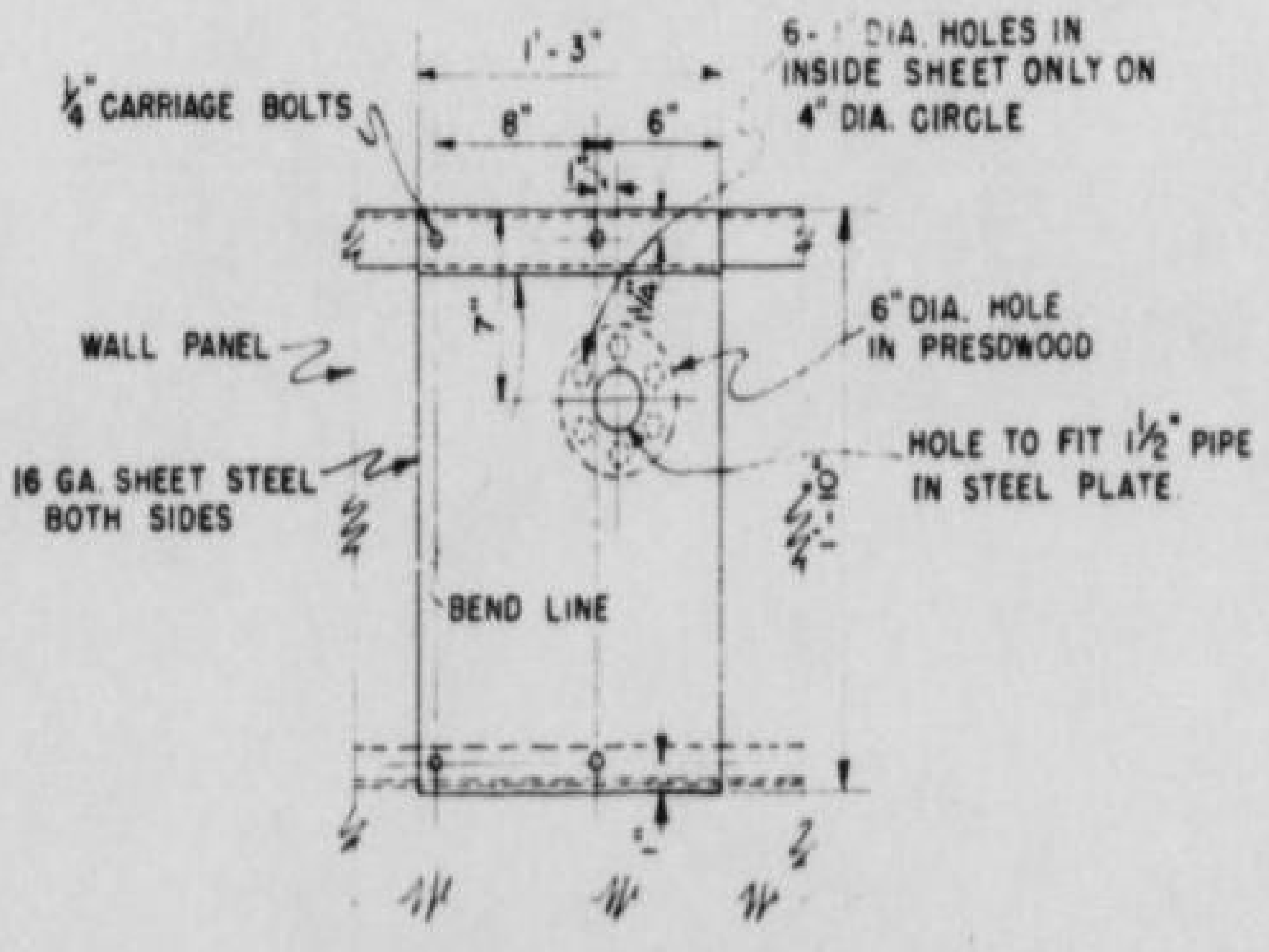

ROOF TRUSS LOWER CHORD
3/8" BOLT, NUT & LOCK WASHER
NO. 16 GAUGE X 7/8 MIN. PERFORATED HANGER
CONDUIT

DETAIL B


ENGINE - GENERATOR BED PLATE
3/4 X 3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
CUT OUT CORK FOR BOLT HEADS
2" X 3" CORK STRIP 6'-11" LG., ARMSTRONG CORK CO. "XL VIBROCORK" OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN TO FIT CHANNEL.
3" - 4.1# CHANNEL 6'-11" LONG BOLTED TO BED PLATE
CONCRETE FLOOR
3"

ENGINE MOUNTING DETAIL

FIG. 3


1'-3"
8"
6"
1/4" CARRIAGE BOLTS
6-1" DIA. HOLES IN INSIDE SHEET ONLY ON 4" DIA. CIRCLE
WALL PANEL
6" DIA. HOLE IN PRESDWOOD
HOLE TO FIT 1 1/2" PIPE IN STEEL PLATE.
16 GA. SHEET STEEL BOTH SIDES
BEND LINE

WALL PLATE FOR EXHAUST PIPE

TWO REQUIRED, ONE AS SHOWN AND
ONE WITHOUT BEND FOR INSIDE WALL

FIG 4

NO.	REVISION	DATE	CHECKED
11	REVISED CABINETS SEC. A-A & PLAN	6-13-51	
10	ADDED STORAGE SHELF	4-6-51	

NO	REVISION	DATE	CHECKED
9	CHANGED EXHAUST PIPE SLOPE	5-6-49	
8	CHANGED 2'-6" TO 2'-4" (RADIATOR)	4-9-47	
7	ADDED VOLTAGE REGULATOR	3-14-47	
6	ADDED MUFFLER SUPPORT	1-7-47	
5	CHANGED AIR DUCT & HOOD	12-20-46	
4	REMOVED WIRING DIAGRAM FIG 5	5-24-46	
3	ADDED PIPE HANGER DETAILS	2-28-46	
2	DELETED ROOF VENT. ADDED THERMOSTAT	1-8-45	
1	ADDED MUFFLER	11-[illegible]-44	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

VH.F. RANGE BUILDING
16' X 28' TYPE "S"
8 KVA ENG.-GEN. INSTALLATION

APPROVED H. W. HOWARD
CHIEF AIRWAYS ENGINEERING DIVISION
SUBMITTED BY:
CHIEF OF SECTION
CHECKED BY:
DRAWN BY J.F.F.
DATE 3-18-44
DR. D-3317-4

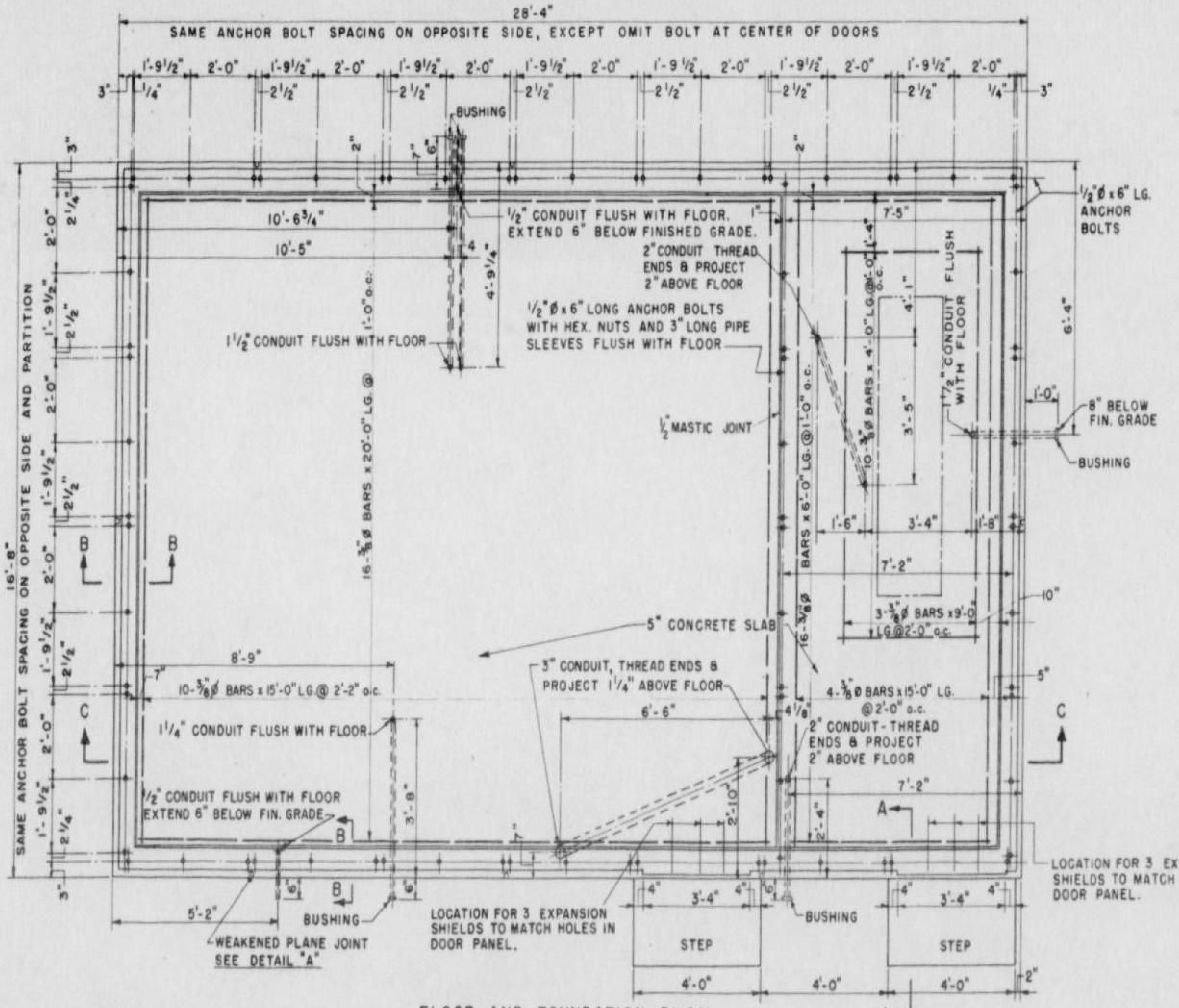
ESTIMATED QUANTITIES	(OFFICE USE ONLY)
CONCRETE	9 CU. YDS.
8" CONCRETE BLOCK	132 SQ. FT.

NOTES:

6" SOLID CONCRETE WALLS MAY BE USED IN LIEU OF CONCRETE BLOCKS. UNLESS OTHERWISE SPECIFIED IN THE PROPOSAL, THE SOLID CONCRETE WALL SHALL BE PLACED ON A FOOTING OF SIZE AS SHOWN FOR CONCRETE BLOCKS. THE WALL THICKNESS SHALL BE INCREASED TO 8" IF NO FOOTING IS USED. NO REINFORCING STEEL SHALL BE USED IN THE SOLID CONCRETE WALL, BUT WEAKENED PLANE JOINTS AS AND WHERE SHOWN FOR THE CONCRETE CAP SHALL BE CARRIED DOWN THE FULL DEPTH OF THE SOLID CONCRETE WALL TO PREVENT UNSIGHTLY CRACKS.

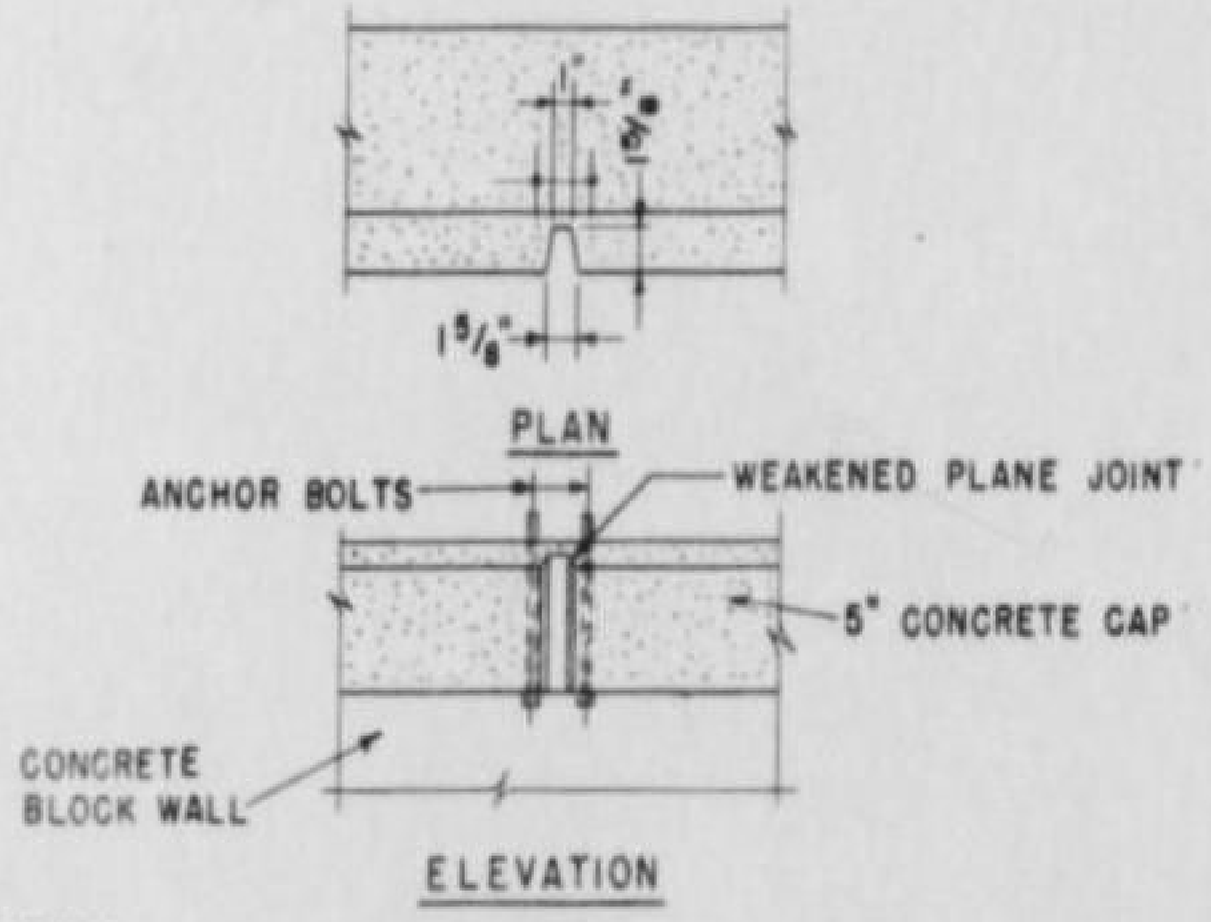
LOCATION OF ALL CONDUITS THRU FLOOR SLAB WHICH TERMINATE IN BOXES OR CABINETS FURNISHED, MAY BE VARIED SLIGHTLY IN ORDER THAT CONDUITS LINE UP WITH KNOCKOUT HOLES IN THE BOXES. ALL CONDUITS TO HAVE STANDARD RADUIS BENDS. ALL CONDUITS EXTENDING OUTSIDE FOUNDATION WALL SHALL BE 1'-6" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED.

CONCRETE BLOCK SHALL MEET REQUIREMENTS FOR LOAD BEARING UNITS CALLED FOR IN FEDERAL SPECIF'N SS-C-621.



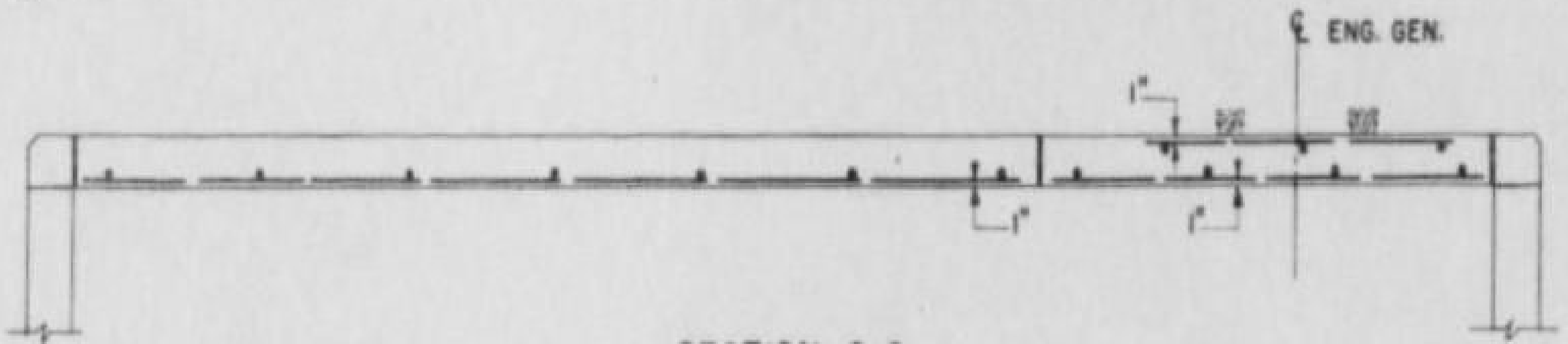
28'-4"
SAME ANCHOR BOLT SPACING ON OPPOSITE SIDE, EXCEPT OMIT BOLT AT CENTER OF DOORS
1'-9 1/2"
2'-0"
2 1/2"
1/4"
3"
BUSHING
SAME ANCHOR BOLT SPACING ON OPPOSITE SIDE AND PARTITION
16'-8"
2 1/4"
10'-6 3/4"
10'-5"
1/2" CONDUIT FLUSH WITH FLOOR. EXTEND 6" BELOW FINISHED GRADE.
2" CONDUIT THREAD ENDS & PROJECT 2" ABOVE FLOOR
1/2"Ø x 6" LONG ANCHOR BOLTS WITH HEX. NUTS AND 3" LONG PIPE SLEEVES FLUSH WITH FLOOR
1 1/2" CONDUIT FLUSH WITH FLOOR
4'-9 1/4"
16-3/8Ø BARS x 20'-0" LG. @ 1'-0" o.c.
1/2" MASTIC JOINT
7'-5"
1/2"Ø x 6" LG. ANCHOR BOLTS
6'-4"
10-3/8Ø BARS x 4'-0" LG.@ 1'-0" o.c.
BARS x 6'-0" LG.@ 1'-0" o.c.
1 1/2" CONDUIT FLUSH WITH FLOOR
3'-5"
4'-1"
1'-0"
8" BELOW FIN. GRADE
BUSHING
1'-6"
3'-4"
1'-8"
7'-2"
3-3/8Ø BARS x 9'-0 LG @ 2'-0" o.c.
10"
5" CONCRETE SLAB
16-3/8Ø
8'-9"
7"
10-3/8Ø BARS x 15'-0" LG.@ 2'-2" o.c.
3" CONDUIT, THREAD ENDS & PROJECT 1 1/4" ABOVE FLOOR
4-3/8Ø BARS x 15'-0" LG. @ 2'-0" o.c.
5"
1 1/4" CONDUIT FLUSH WITH FLOOR
6'-6"
2" CONDUIT-THREAD ENDS & PROJECT 2" ABOVE FLOOR
3'-8"
2'-10"
7'-2"
2'-4"
1/2" CONDUIT FLUSH WITH FLOOR EXTEND 6" BELOW FIN. GRADE
A
B
C
LOCATION FOR 3 EXPANSION SHIELDS TO MATCH HOLES IN DOOR PANEL.
5'-2"
6"
BUSHING
WEAKENED PLANE JOINT SEE DETAIL "A"
LOCATION FOR 3 EXPANSION SHIELDS TO MATCH HOLES IN DOOR PANEL.
4"
3'-4"
STEP
BUSHING
4'-0"
2"

FLOOR AND FOUNDATION PLAN

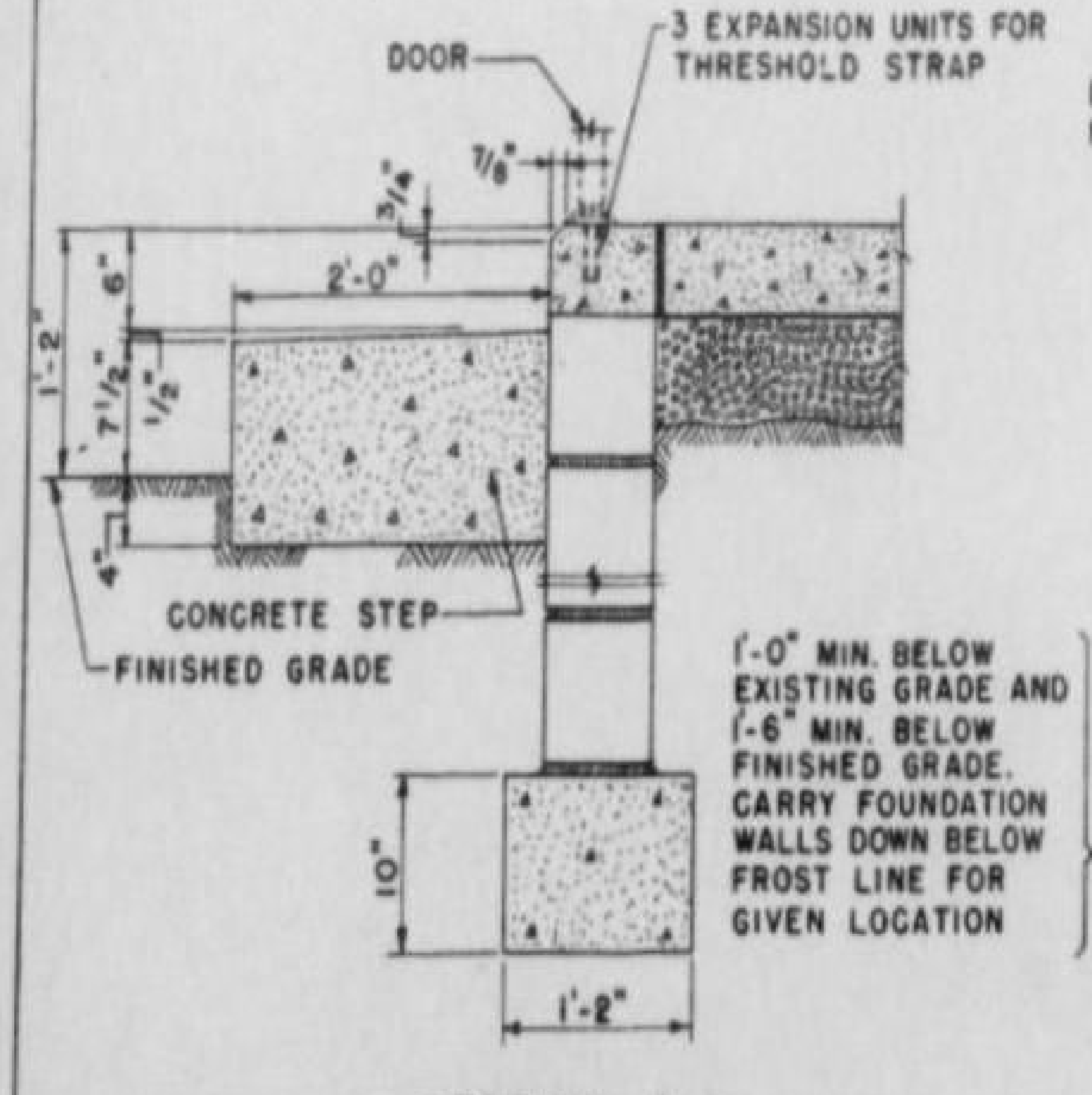


DETAIL "A"

FOR TYPICAL PLOT PLAN AND REFERENCE DRAWING SEE DRAWING D-2798-5A

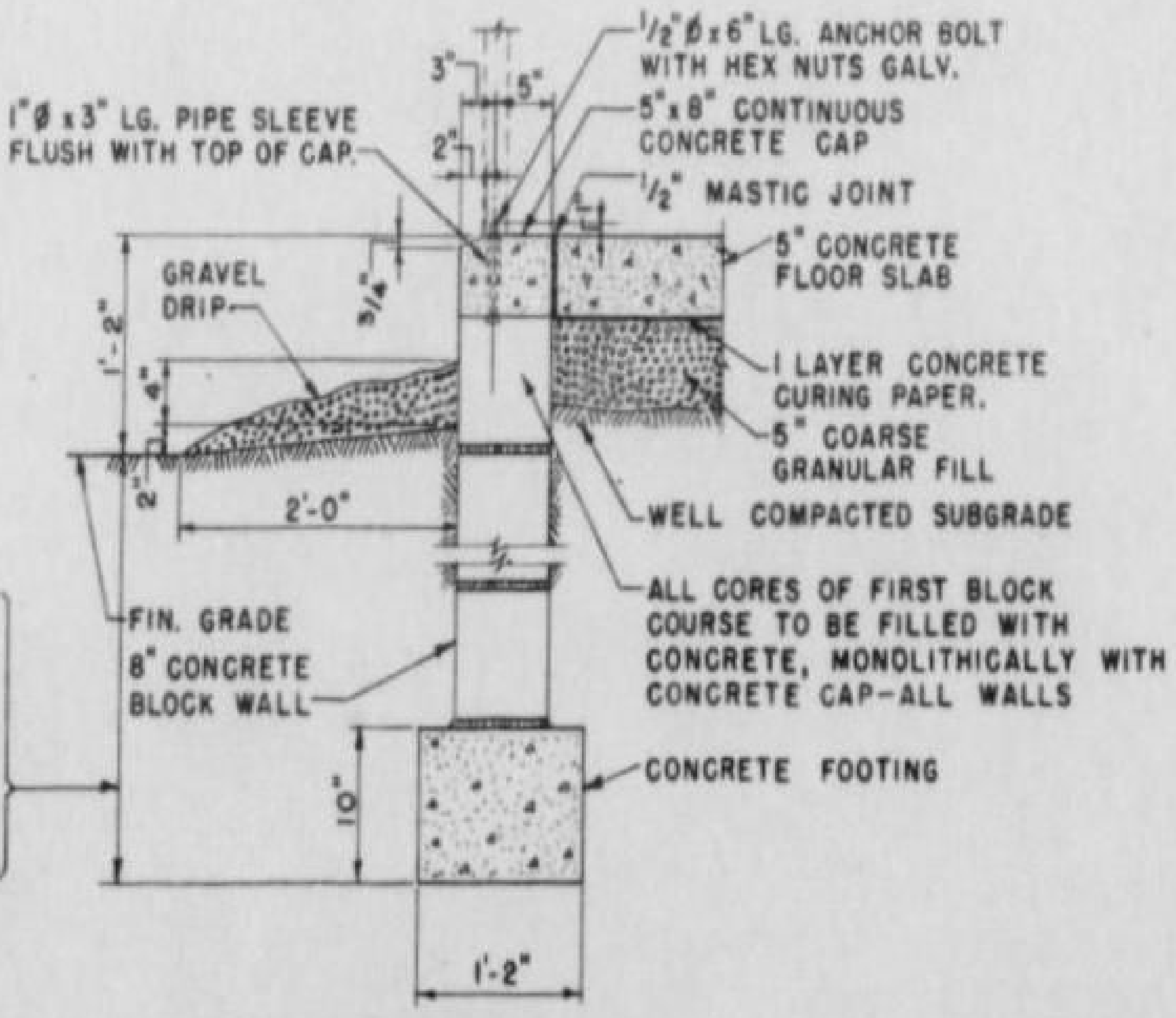


SECTION C-C



DOOR
3 EXPANSION UNITS FOR THRESHOLD STRAP
7/8"
3/4"
2'-0"
6"
1'-2"
7 1/2"
1/2"
4"
CONCRETE STEP
FINISHED GRADE
1'-0" MIN. BELOW EXISTING GRADE AND 1'-6" MIN. BELOW FINISHED GRADE. CARRY FOUNDATION WALLS DOWN BELOW FROST LINE FOR GIVEN LOCATION
10"
1'-2"

SECTION A-A



1"Ø x 3" LG. PIPE SLEEVE FLUSH WITH TOP OF CAP.
3"
5"
2"
1/2"Ø x 6" LG. ANCHOR BOLT WITH HEX NUTS GALV.
5" x 8" CONTINUOUS CONCRETE CAP
1/2" MASTIC JOINT
5" CONCRETE FLOOR SLAB
GRAVEL DRIP
3/4"
1'-2"
4"
2"
1 LAYER CONCRETE CURING PAPER.
5" COARSE GRANULAR FILL
2'-0"
WELL COMPACTED SUBGRADE
FIN. GRADE
8" CONCRETE BLOCK WALL
ALL CORES OF FIRST BLOCK COURSE TO BE FILLED WITH CONCRETE, MONOLITHICALLY WITH CONCRETE CAP-ALL WALLS
CONCRETE FOOTING
10"
1'-2"

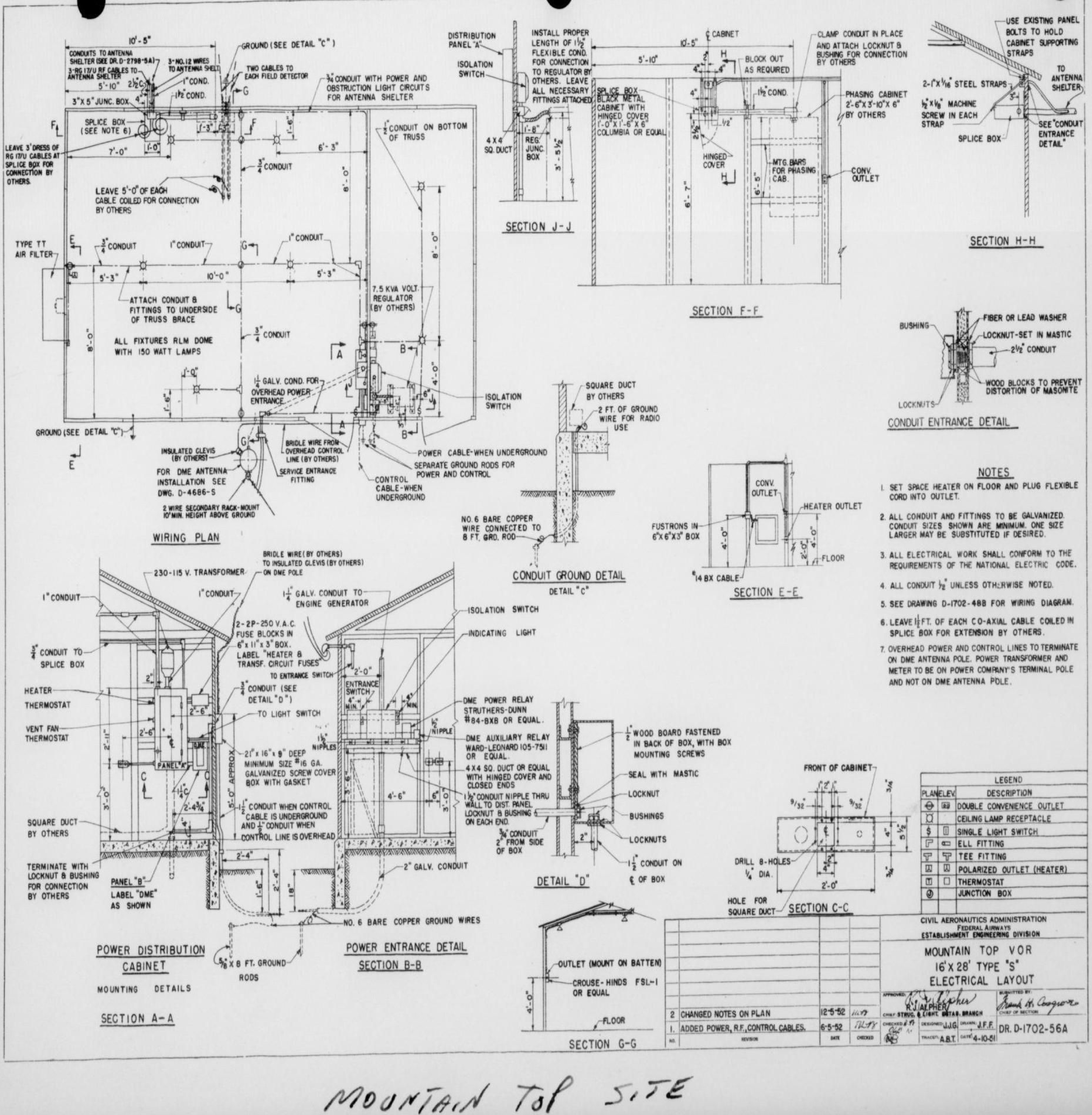
SECTION B-B

NO.	REVISION	DATE	CHECKED

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

MOUNTAIN TOP VOR
16'x28' TYPE "S" BUILDING
FLOOR & FOUNDATION

APPROVED: for R. J. ALPHER
CHIEF STRUC. & LTG. ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
CHECKED
DESIGNED
DRAWN A.B.T.
TRACED D.T.
DATE 4-10-51
DR. D-1703-56



WIRING PLAN
10'-5"
CONDUITS TO ANTENNA SHELTER (SEE DR. D-2798-5A)
3-RG 17/U RF CABLES TO ANTENNA SHELTER
3-NO. 12 WIRES TO ANTENNA SHELTER
GROUND (SEE DETAIL "C")
TWO CABLES TO EACH FIELD DETECTOR
3/4" CONDUIT WITH POWER AND OBSTRUCTION LIGHT CIRCUITS FOR ANTENNA SHELTER
5'-10"
2 1/2" C.
1" COND.
1 1/2" COND.
3"X5" JUNC. BOX
SPLICE BOX (SEE NOTE 6)
LEAVE 3' DRESS OF RG 17/U CABLES AT SPLICE BOX FOR CONNECTION BY OTHERS.
7'-0"
1'-0"
1'-3"
6'-3"
1/2" CONDUIT ON BOTTOM OF TRUSS
3/4" CONDUIT
LEAVE 5'-0" OF EACH CABLE COILED FOR CONNECTION BY OTHERS
8'-0"
TYPE TT AIR FILTER
3/4" CONDUIT
1" CONDUIT
1" CONDUIT
5'-3"
10'-0"
5'-3"
ATTACH CONDUIT & FITTINGS TO UNDERSIDE OF TRUSS BRACE
ALL FIXTURES RLM DOME WITH 150 WATT LAMPS
7.5 KVA VOLT. REGULATOR (BY OTHERS)
3/4" CONDUIT
1 1/4" GALV. COND. FOR OVERHEAD POWER ENTRANCE
ISOLATION SWITCH
4'-0"
1'-6"
GROUND (SEE DETAIL "C")
INSULATED CLEVIS (BY OTHERS)
FOR DME ANTENNA INSTALLATION SEE DWG. D-4686-S
2 WIRE SECONDARY RACK-MOUNT 10' MIN. HEIGHT ABOVE GROUND
BRIDLE WIRE FROM OVERHEAD CONTROL LINE (BY OTHERS)
SERVICE ENTRANCE FITTING
POWER CABLE-WHEN UNDERGROUND
SEPARATE GROUND RODS FOR POWER AND CONTROL
CONTROL CABLE-WHEN UNDERGROUND
SECTION J-J
DISTRIBUTION PANEL "A"
ISOLATION SWITCH
INSTALL PROPER LENGTH OF 1 1/2" FLEXIBLE COND. FOR CONNECTION TO REGULATOR BY OTHERS. LEAVE ALL NECESSARY FITTINGS ATTACHED.
4X4 SQ. DUCT
1'-8"
REG. JUNC. BOX
3'-5 1/2"
SECTION F-F
℄ CABINET
10'-5"
5'-10"
BLOCK OUT AS REQUIRED
CLAMP CONDUIT IN PLACE AND ATTACH LOCKNUT & BUSHING FOR CONNECTION BY OTHERS
SPLICE BOX BLACK METAL CABINET WITH HINGED COVER 1'-0"X1'-6"X6" COLUMBIA OR EQUAL
1 1/2" COND.
PHASING CABINET 2'-6"X3'-10"X6" BY OTHERS
HINGED COVER
MTG. BARS FOR PHASING CAB.
CONV. OUTLET
6'-7"
6'-5"
SECTION H-H
USE EXISTING PANEL BOLTS TO HOLD CABINET SUPPORTING STRAPS
2-1"X1/16" STEEL STRAPS
TO ANTENNA SHELTER
1/2"X1/8" MACHINE SCREW IN EACH STRAP
SEE "CONDUIT ENTRANCE DETAIL"
SPLICE BOX
CONDUIT ENTRANCE DETAIL
BUSHING
FIBER OR LEAD WASHER
LOCKNUT-SET IN MASTIC
2 1/2" CONDUIT
WOOD BLOCKS TO PREVENT DISTORTION OF MASONITE
LOCKNUTS
CONDUIT GROUND DETAIL
DETAIL "C"
SQUARE DUCT BY OTHERS
2 FT. OF GROUND WIRE FOR RADIO USE
NO. 6 BARE COPPER WIRE CONNECTED TO 8 FT. GRD. ROD
SECTION E-E
CONV. OUTLET
HEATER OUTLET
FUSTRONS IN 6"X6"X3" BOX
#14 BX CABLE
4'-0"
2'-0"
FLOOR
POWER DISTRIBUTION CABINET
MOUNTING DETAILS
SECTION A-A
1" CONDUIT
230-115 V. TRANSFORMER
1" CONDUIT
3/4" CONDUIT TO SPLICE BOX
HEATER THERMOSTAT
VENT FAN THERMOSTAT
2-2P-250 V.A.C. FUSE BLOCKS IN 6"x11"x3" BOX. LABEL "HEATER & TRANSF. CIRCUIT FUSES"
3/4" CONDUIT (SEE DETAIL "D")
TO LIGHT SWITCH
PANEL "A"
21"x16"x9" DEEP MINIMUM SIZE #16 GA. GALVANIZED SCREW COVER BOX WITH GASKET
5'-0" APPROX.
1 1/2" CONDUIT WHEN CONTROL CABLE IS UNDERGROUND AND 1/2" CONDUIT WHEN CONTROL LINE IS OVERHEAD
SQUARE DUCT BY OTHERS
TERMINATE WITH LOCKNUT & BUSHING FOR CONNECTION BY OTHERS
PANEL "B" LABEL "DME" AS SHOWN
2'-4"
2'-4 3/4"
3'-0"
5/8"X8 FT. GROUND RODS
NO. 6 BARE COPPER GROUND WIRES
2" GALV. CONDUIT
POWER ENTRANCE DETAIL
SECTION B-B
BRIDLE WIRE (BY OTHERS) TO INSULATED CLEVIS (BY OTHERS) ON DME POLE
1 1/4" GALV. CONDUIT TO ENGINE GENERATOR
TO ENTRANCE SWITCH
ENTRANCE SWITCH
ISOLATION SWITCH
INDICATING LIGHT
DME POWER RELAY STRUTHERS-DUNN #84-BXB OR EQUAL.
DME AUXILIARY RELAY WARD-LEONARD 105-7511 OR EQUAL.
4X4 SQ. DUCT OR EQUAL WITH HINGED COVER AND CLOSED ENDS
1 1/2" CONDUIT NIPPLE THRU WALL TO DIST. PANEL LOCKNUT & BUSHING ON EACH END.
1 1/2" NIPPLES
1 1/2" NIPPLE
4'-6"
DETAIL "D"
1/2" WOOD BOARD FASTENED IN BACK OF BOX, WITH BOX MOUNTING SCREWS
SEAL WITH MASTIC
LOCKNUT
BUSHINGS
LOCKNUTS
3/4" CONDUIT 2" FROM SIDE OF BOX
1 1/2" CONDUIT ON ℄ OF BOX
SECTION C-C
FRONT OF CABINET
DRILL 8-HOLES 1/4" DIA.
HOLE FOR SQUARE DUCT
2'-0"
SECTION G-G
OUTLET (MOUNT ON BATTEN)
CROUSE-HINDS FSL-1 OR EQUAL
FLOOR
4'-0"

NOTES

1. SET SPACE HEATER ON FLOOR AND PLUG FLEXIBLE CORD INTO OUTLET.
2. ALL CONDUIT AND FITTINGS TO BE GALVANIZED. CONDUIT SIZES SHOWN ARE MINIMUM. ONE SIZE LARGER MAY BE SUBSTITUTED IF DESIRED.
3. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
4. ALL CONDUIT 1/2" UNLESS OTHERWISE NOTED.
5. SEE DRAWING D-1702-48B FOR WIRING DIAGRAM.
6. LEAVE 1 1/2 FT. OF EACH CO-AXIAL CABLE COILED IN SPLICE BOX FOR EXTENSION BY OTHERS.
7. OVERHEAD POWER AND CONTROL LINES TO TERMINATE ON DME ANTENNA POLE. POWER TRANSFORMER AND METER TO BE ON POWER COMPANY'S TERMINAL POLE AND NOT ON DME ANTENNA POLE.

LEGEND

PLAN	ELEV.	DESCRIPTION
⊖	▭	DOUBLE CONVENIENCE OUTLET
☒		CEILING LAMP RECEPTACLE
$	▯	SINGLE LIGHT SWITCH
⌐	▭	ELL FITTING
⊤	⊤	TEE FITTING
⊠	⊠	POLARIZED OUTLET (HEATER)
⊡	□	THERMOSTAT
ⓙ		JUNCTION BOX

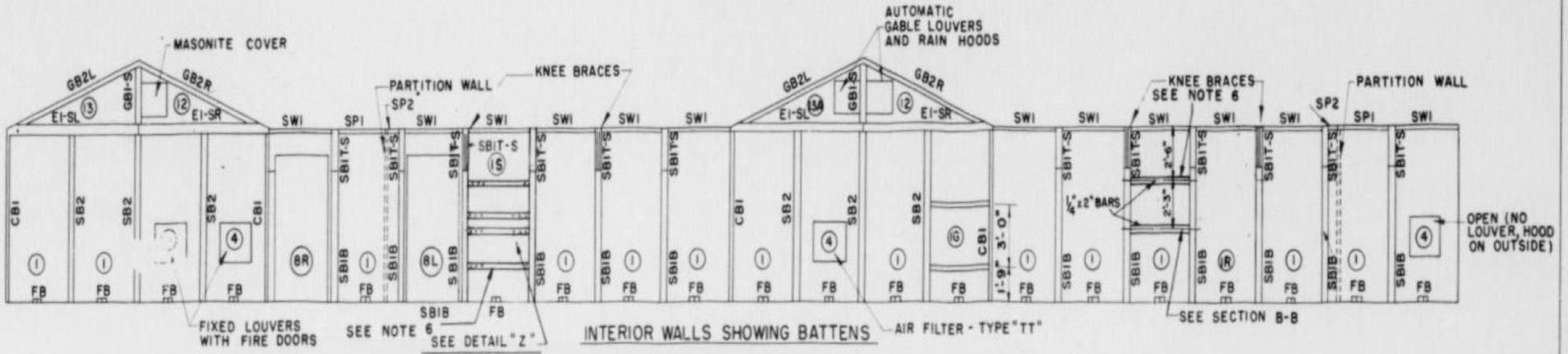
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

MOUNTAIN TOP VOR
16' X 28' TYPE "S"
ELECTRICAL LAYOUT

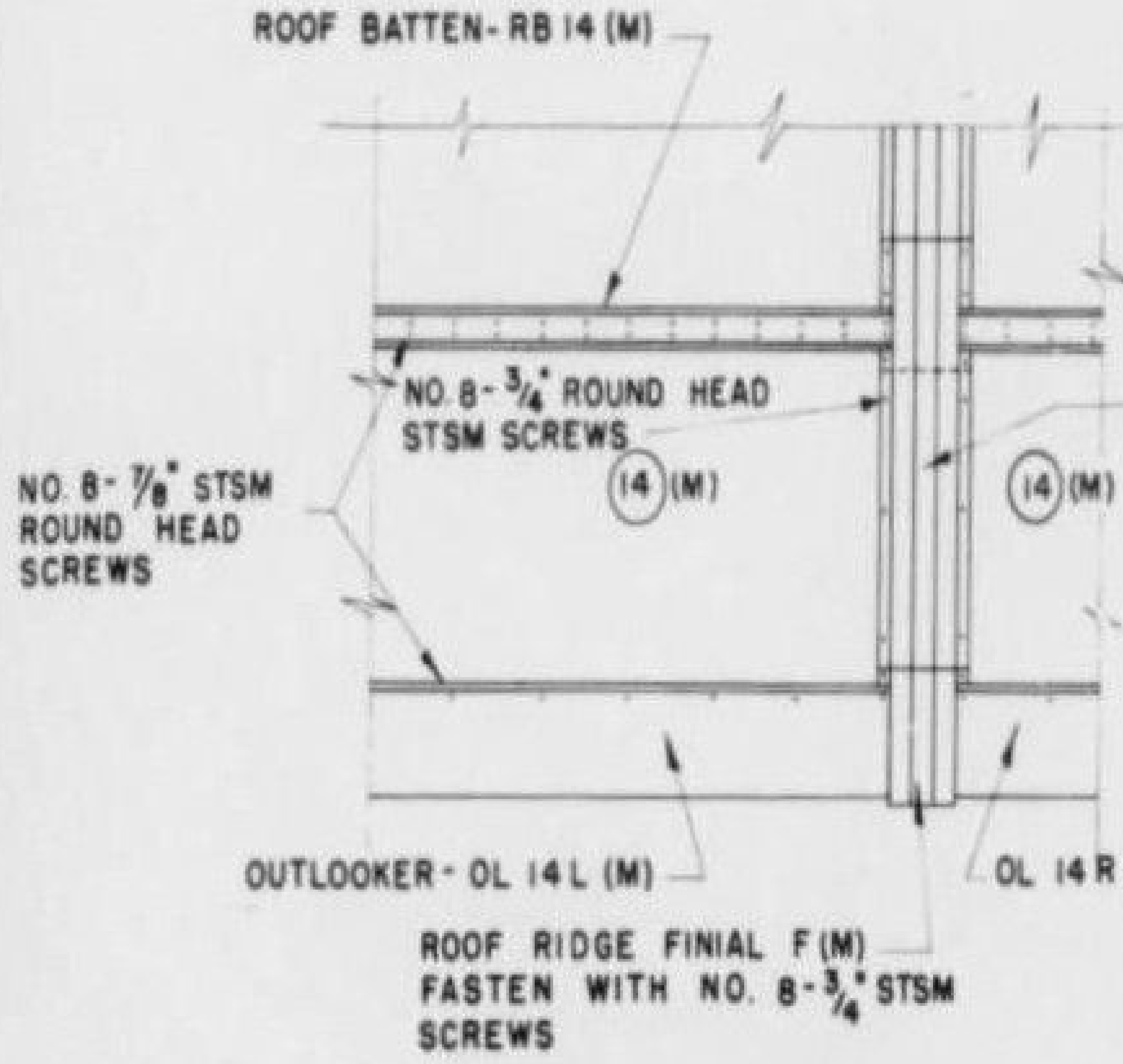
NO.	REVISION	DATE	CHECKED
2	CHANGED NOTES ON PLAN	12-5-52	
1.	ADDED POWER, R.F., CONTROL CABLES.	6-5-52	

APPROVED: R. J. Alpher
R.J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
DESIGNED J.J.G.
DRAWN J.F.F.
TRACED A.B.T.
DATE 4-10-51
DR. D-1702-56A

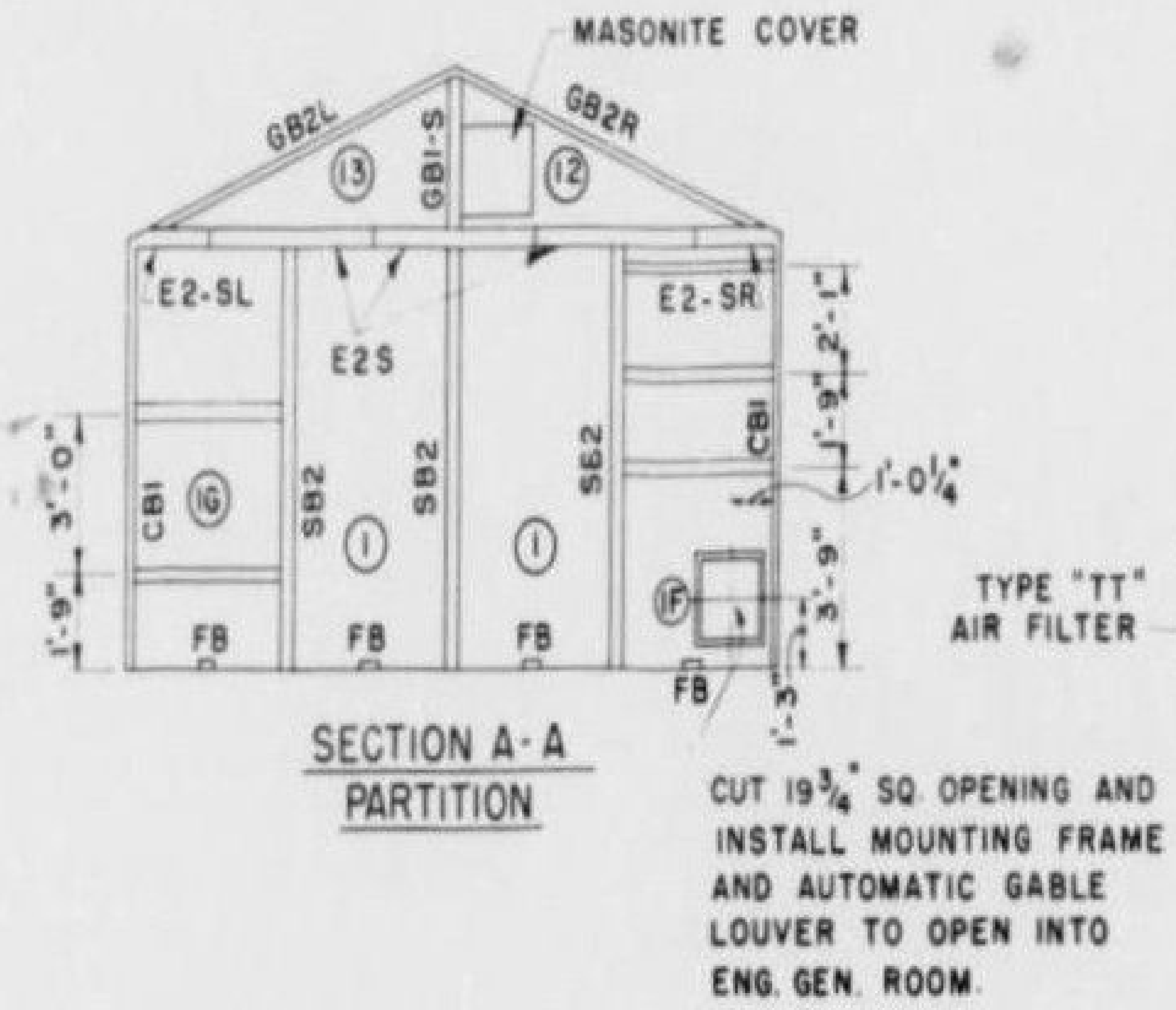
MOUNTAIN TOP SITE



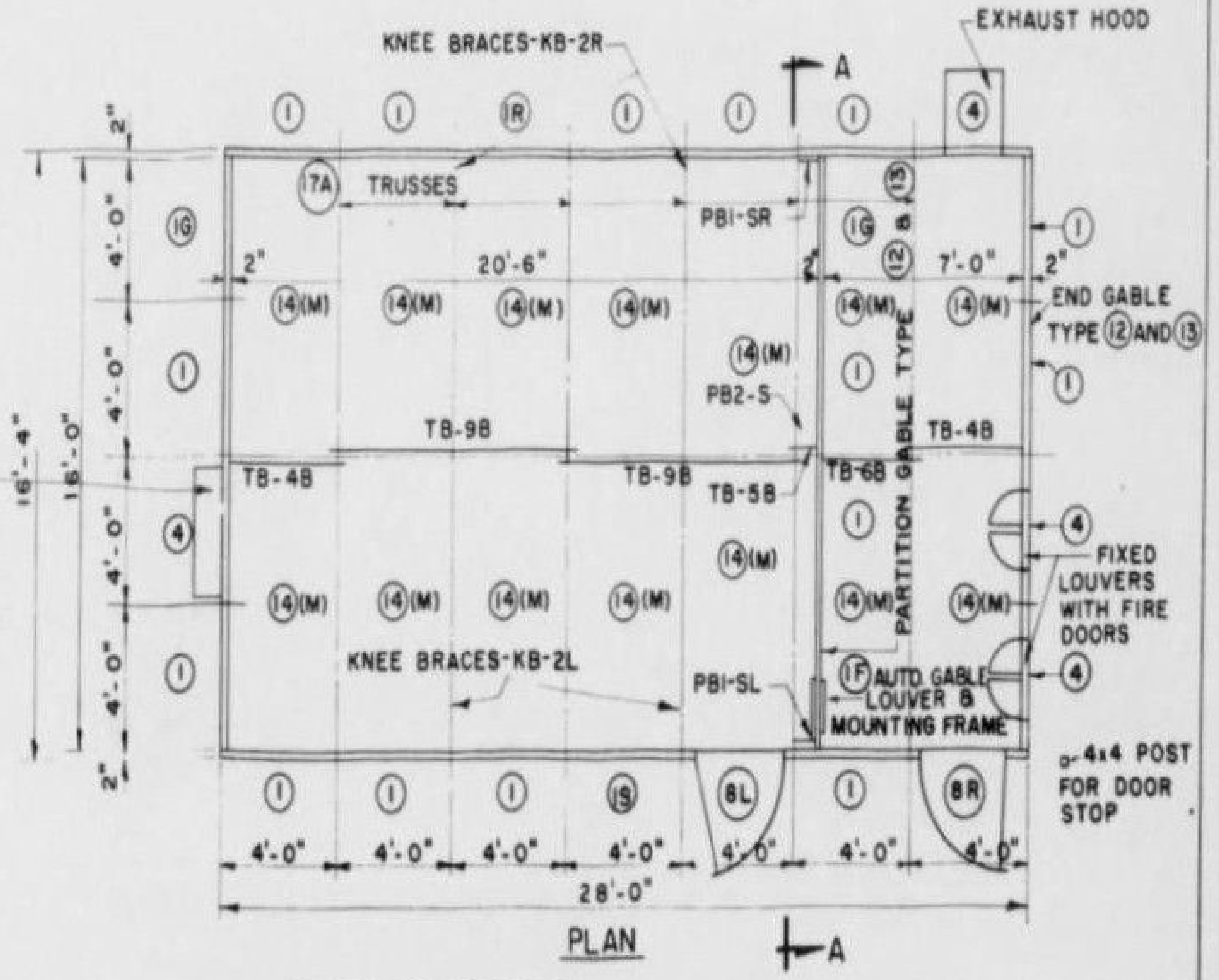
INTERIOR WALLS SHOWING BATTENS


ROOF BATTEN-RB 14 (M)
NO. 8-¾" ROUND HEAD STSM SCREWS
ROOF RIDGE-RR1 (M)
NO. 8-⅞" STSM ROUND HEAD SCREWS
14 (M)
OUTLOOKER-OL 14L (M)
OL 14R (M)
ROOF RIDGE FINIAL F(M) FASTEN WITH NO. 8-¾" STSM SCREWS

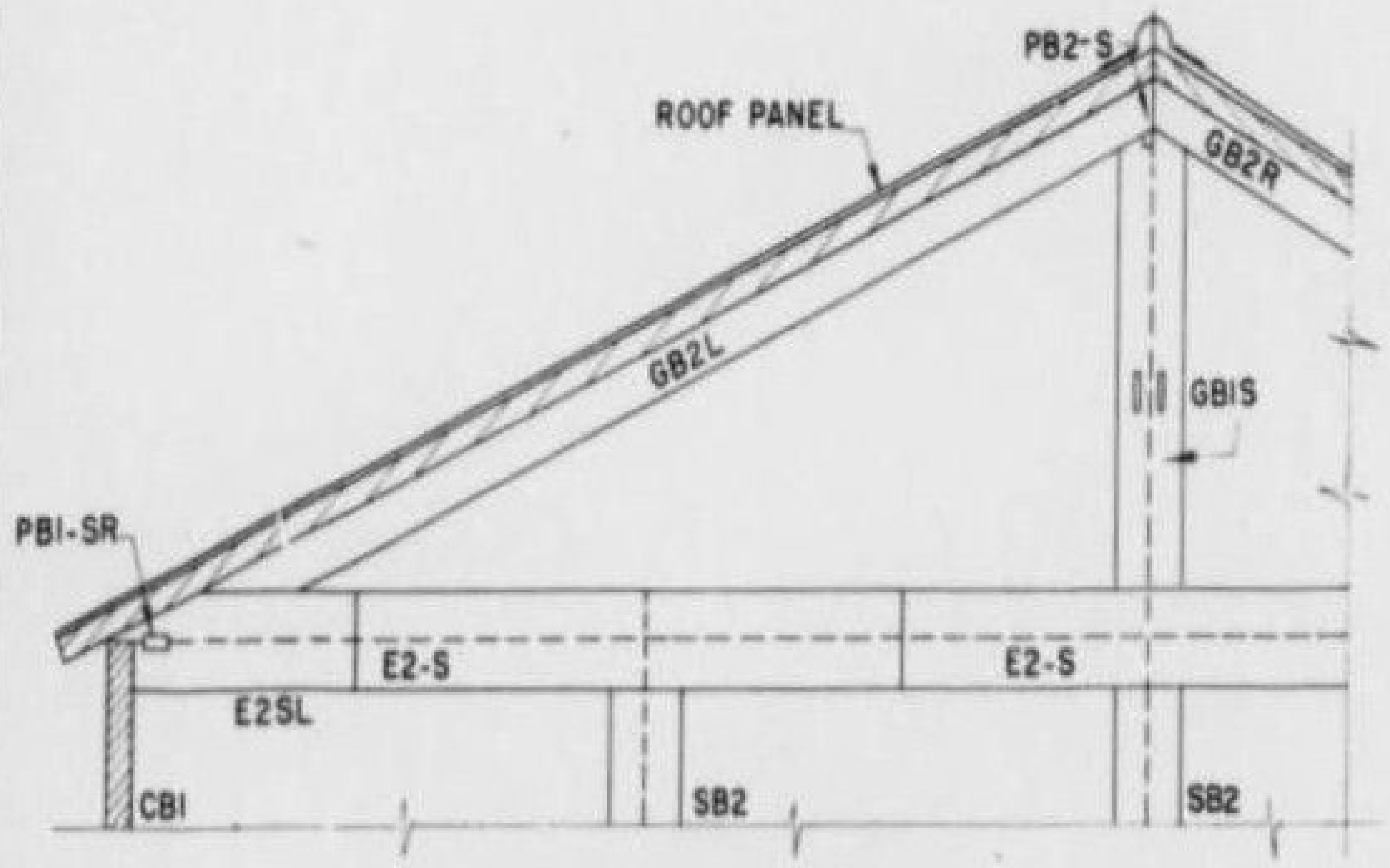
PART ROOF PLAN


MASONITE COVER
GB2L
GB1-S
GB2R
E2-SL
E2S
E2-SR
CB1
SB2
FB
3'-0"
1'-9"
2'-1"
1'-9"
1'-0¼"
3'-9"
1'-3"
CUT 19¾" SQ. OPENING AND INSTALL MOUNTING FRAME AND AUTOMATIC GABLE LOUVER TO OPEN INTO ENG. GEN. ROOM.

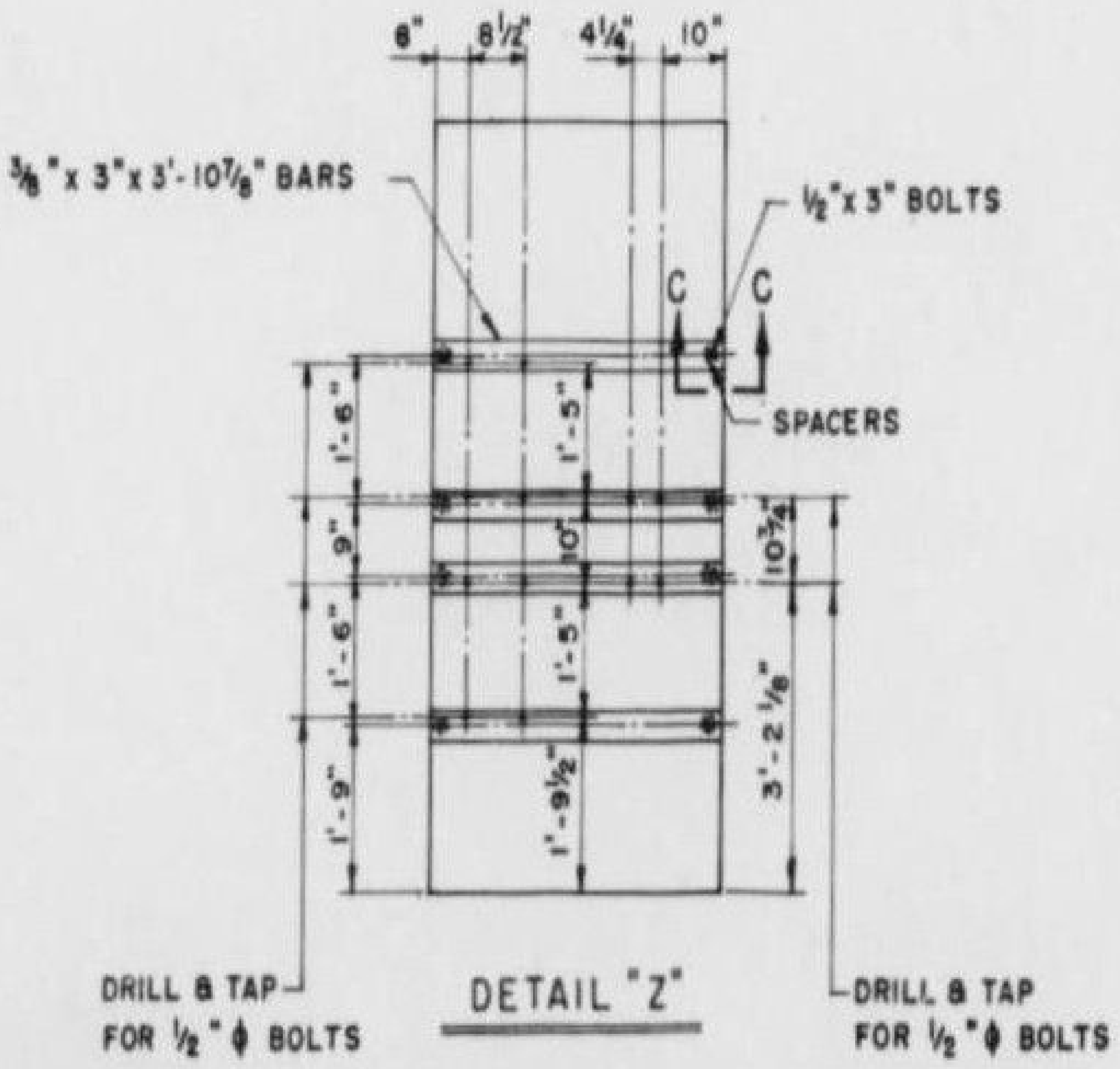
SECTION A-A
PARTITION



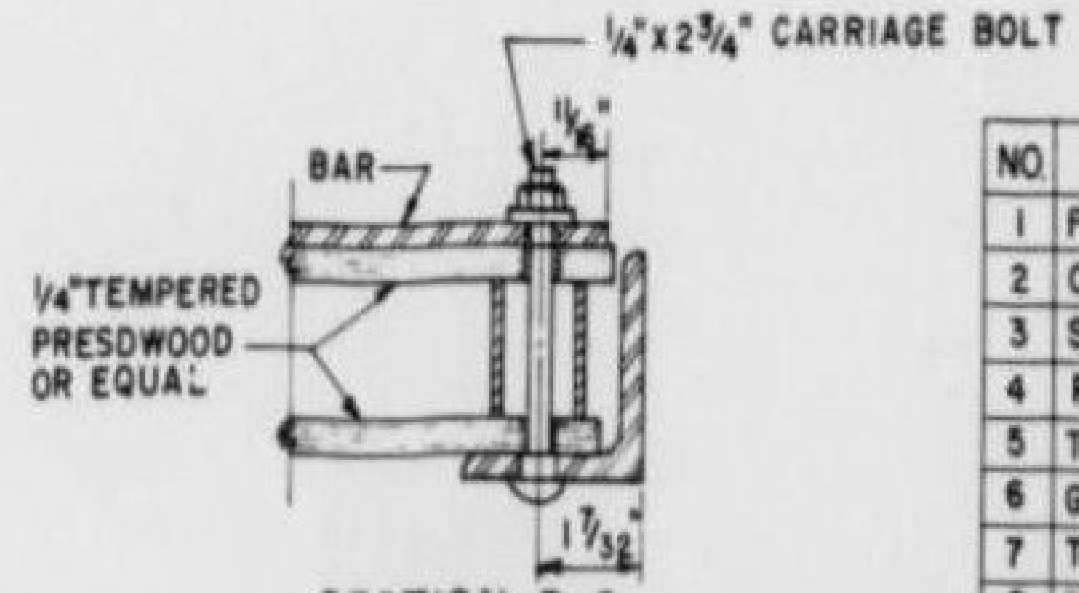
PLAN



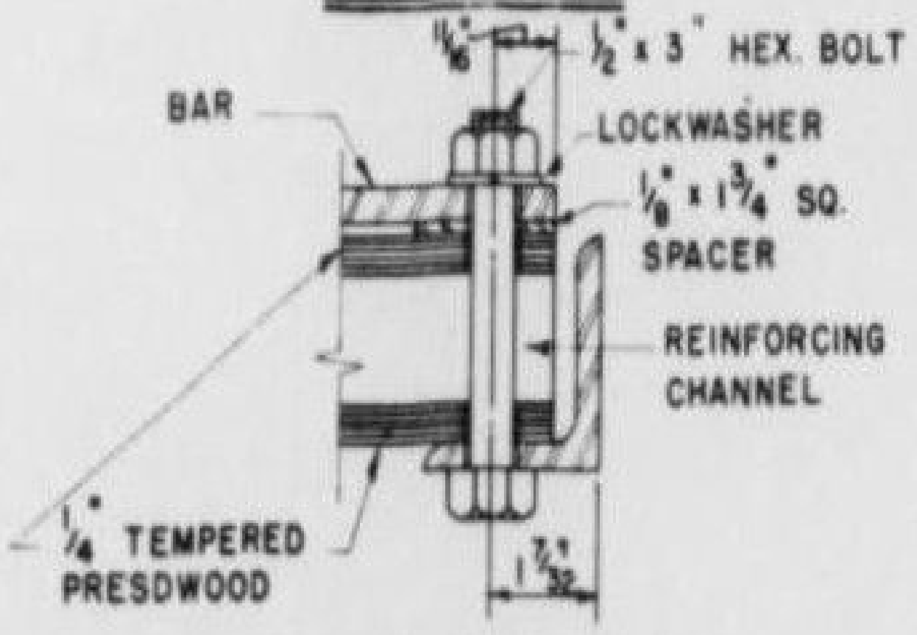
PARTITION GABLE BATTENS



DETAIL "Z"



SECTION B-B



SECTION C-C

NO.	ORDER OF ERECTION
1	FOUNDATION
2	CORNER PANELS
3	SIDE AND END PANELS
4	PARTITION
5	TRUSSES AND KNEE BRACES
6	GABLE PANELS
7	TRUSS TIES
8	ROOF PANELS, OUTLOOKERS
9	RIDGE INSULATION
10	ROOF BATTENS
11	ROOF RIDGE
12	HAND HOLE & EAVES FILLER INSULATION
13	INSIDE BATTENS

NOTES:

1. NUMBERS IN CIRCLES REFER TO PANEL TYPES.
2. KNEE BRACES INSTALLED ONLY WHERE SHOWN.
3. SEE DWG. D-1702-10 & 10A FOR ERECTION DETAILS.
4. SEE DWG. D-1702-12B & 12C AND D-3338-13 FOR MISCELLANEOUS INSTALLATION DETAILS.
5. SEE DWG. C-1701-23E FOR GABLE LOUVER MOUNTING FRAME.
6. WHEN ADDING BARS TO NO. 1 WALL PANELS IN EXISTING BLDGS. CHANGE PANEL DESIGNATIONS AS SHOWN.

NO.	REVISION	DATE	CHECKED
1.	CHANGED BARS, SEE DETAIL "Z"	10-17-52	HL

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

"MOUNTAIN TOP" VOR
16'x28' TYPE "S" BLDG.
ERECTION

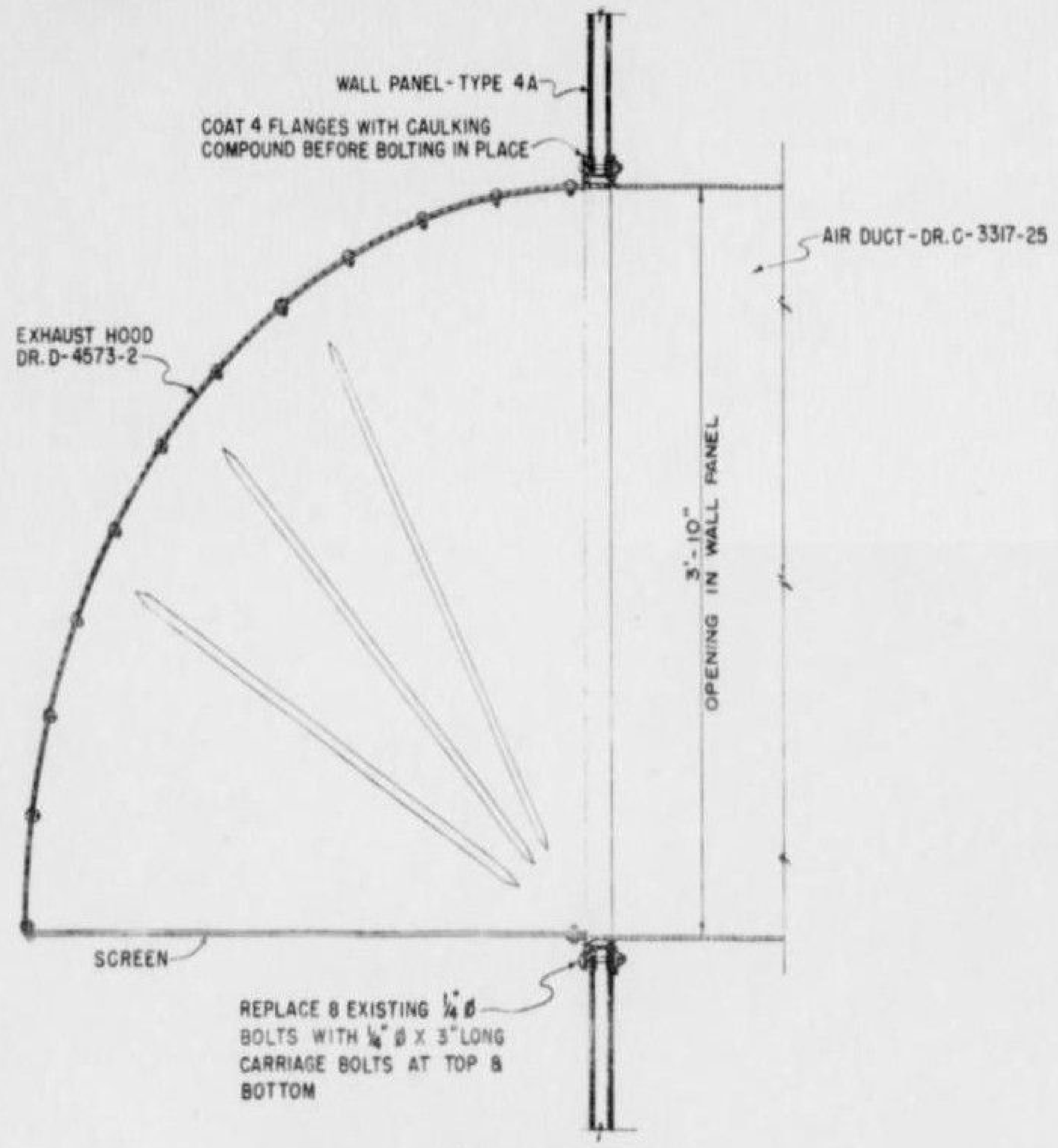
APPROVED:
CHIEF STRUC. & LTG. ESTAB. BR.

SUBMITTED BY: Frank H. Cosgrove
CHIEF DESIGN & SPEC. SECTION

CHECKED RJ ROY CCW
DESIGNED HC
DRAWN:
TRACED RVR
DATE 4-10-51

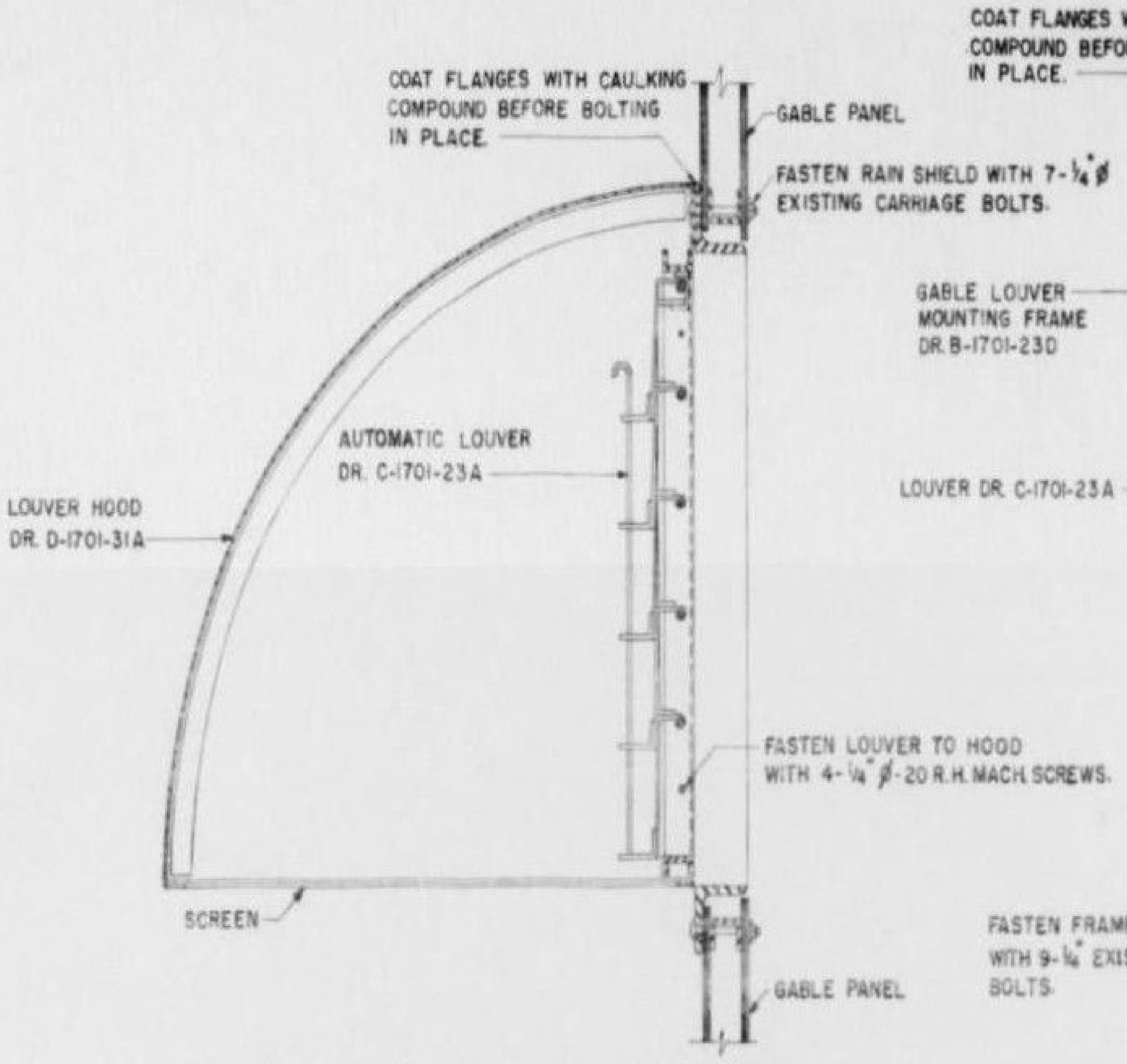
DR. D-1702-56

MOUNTAIN TOP SITE

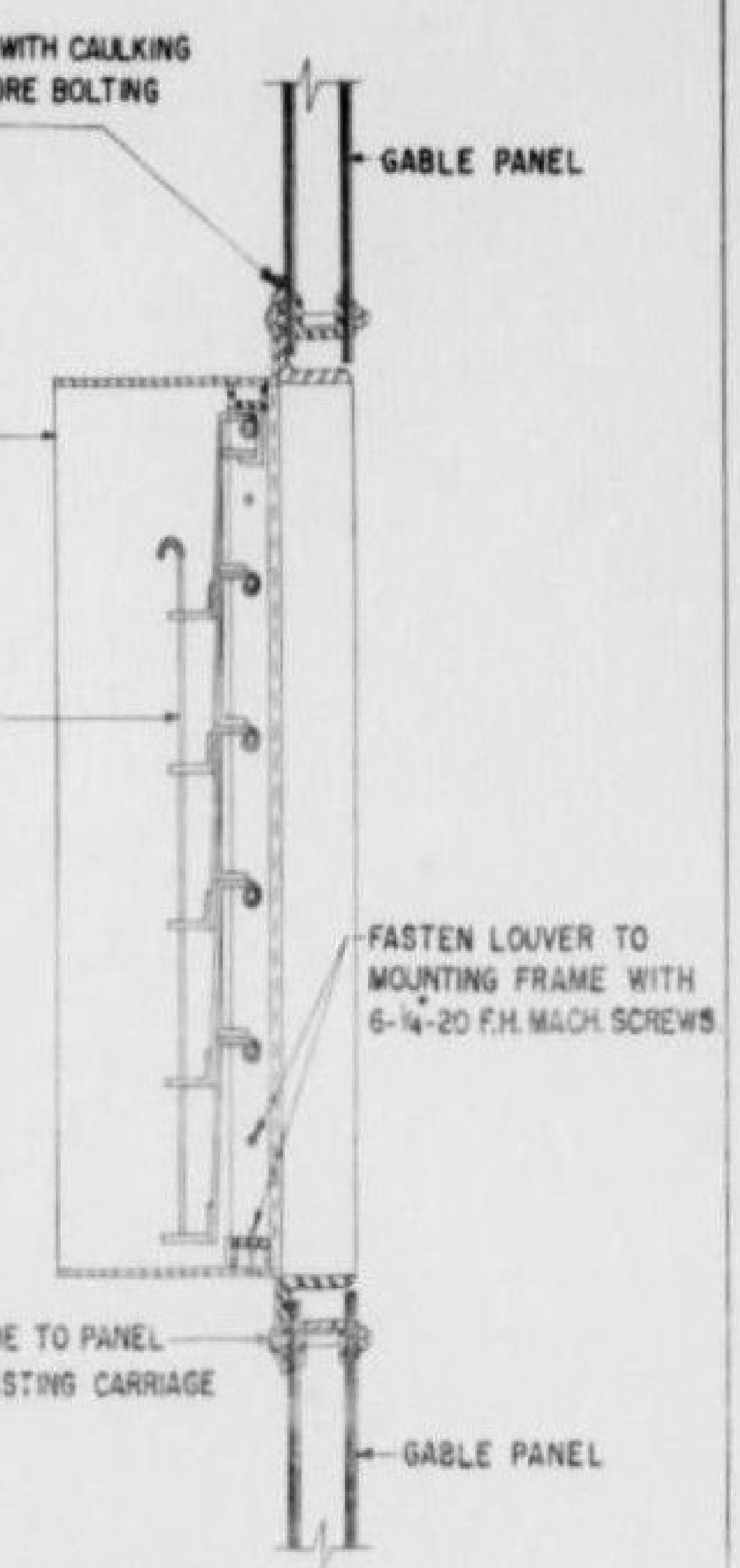

WALL PANEL-TYPE 4A
COAT 4 FLANGES WITH CAULKING COMPOUND BEFORE BOLTING IN PLACE
AIR DUCT-DR. C-3317-25
EXHAUST HOOD DR. D-4573-2
3'-10" OPENING IN WALL PANEL
SCREEN
REPLACE 8 EXISTING 1/4" ø BOLTS WITH 1/4" ø X 3" LONG CARRIAGE BOLTS AT TOP & BOTTOM

EXHAUST HOOD & AIR DUCT

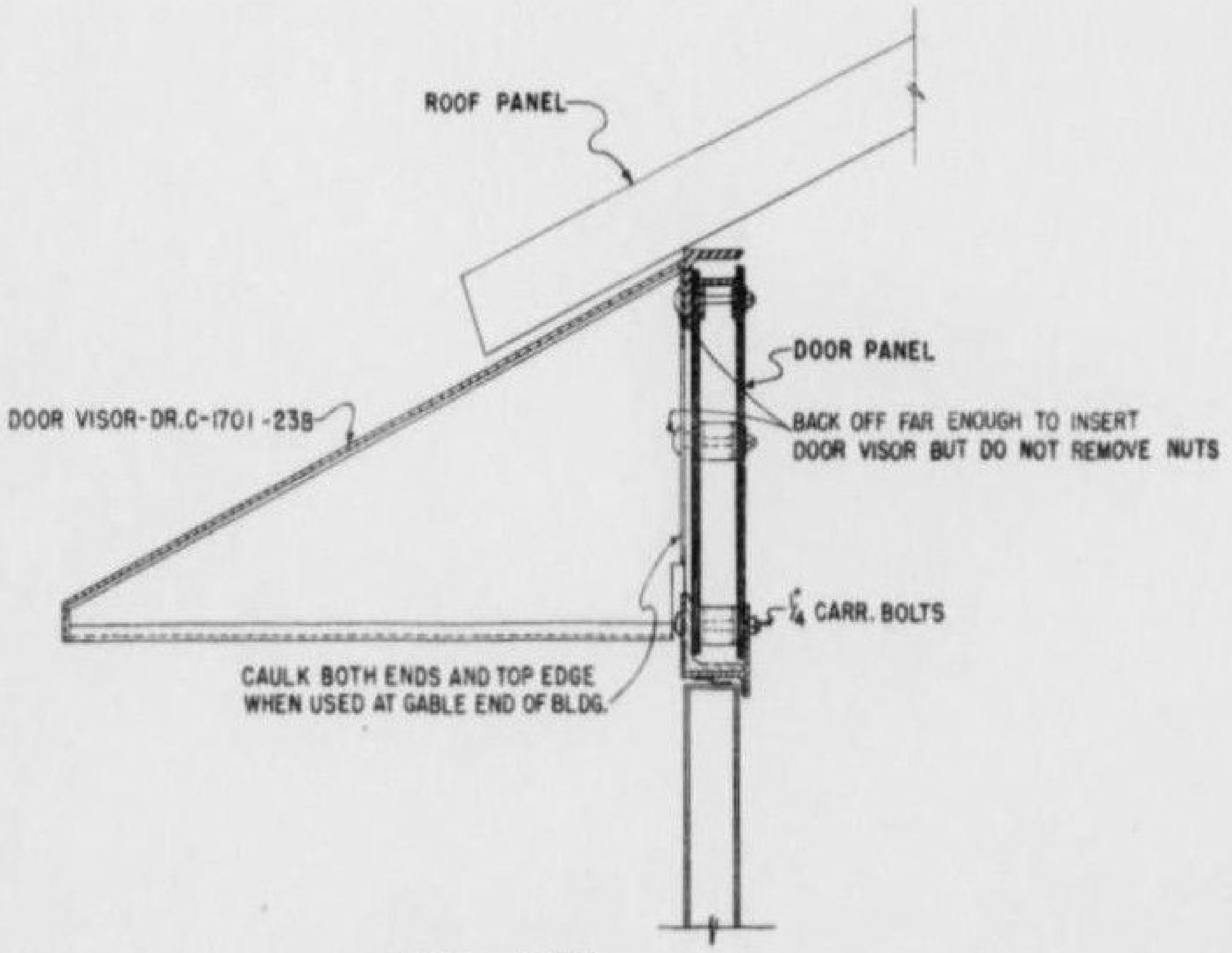
(LARGE)


COAT FLANGES WITH CAULKING COMPOUND BEFORE BOLTING IN PLACE.
GABLE PANEL
FASTEN RAIN SHIELD WITH 7-1/4" ø EXISTING CARRIAGE BOLTS.
AUTOMATIC LOUVER DR. C-1701-23A
LOUVER HOOD DR. D-1701-31A
FASTEN LOUVER TO HOOD WITH 4-1/4" ø-20 R.H. MACH. SCREWS.
SCREEN
GABLE PANEL

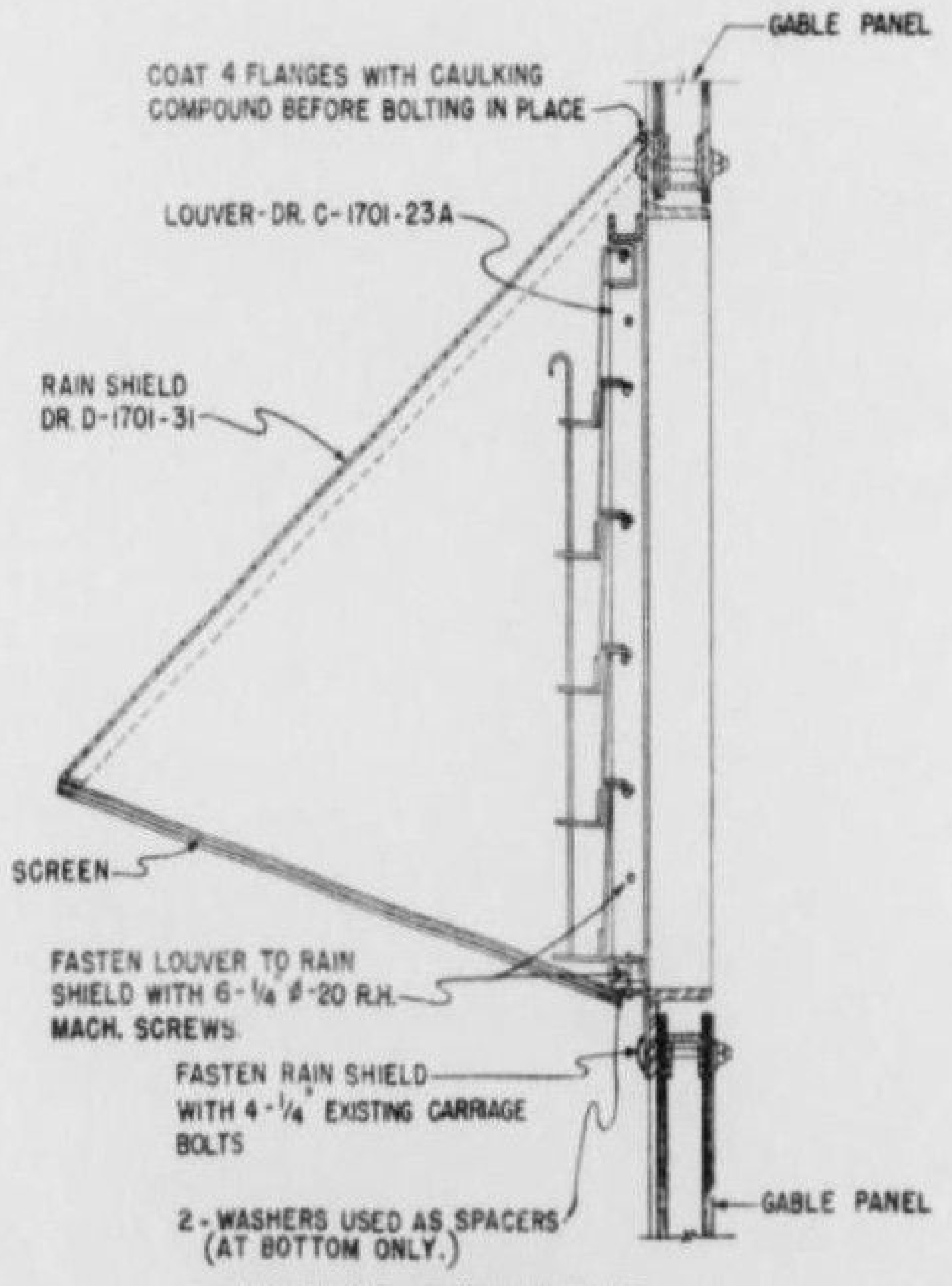
AUTOMATIC GABLE LOUVER AND LOUVER HOOD


COAT FLANGES WITH CAULKING COMPOUND BEFORE BOLTING IN PLACE.
GABLE PANEL
GABLE LOUVER MOUNTING FRAME DR. B-1701-23D
LOUVER DR. C-1701-23A
FASTEN LOUVER TO MOUNTING FRAME WITH 6-1/4"-20 F.H. MACH. SCREWS
FASTEN FRAME TO PANEL WITH 9-1/4" EXISTING CARRIAGE BOLTS.
GABLE PANEL

AUTOMATIC GABLE LOUVER AND MOUNTING FRAME


ROOF PANEL
DOOR PANEL
BACK OFF FAR ENOUGH TO INSERT DOOR VISOR BUT DO NOT REMOVE NUTS
DOOR VISOR-DR. C-1701-23B
1/4" CARR. BOLTS
CAULK BOTH ENDS AND TOP EDGE WHEN USED AT GABLE END OF BLDG.

DOOR VISOR


GABLE PANEL
COAT 4 FLANGES WITH CAULKING COMPOUND BEFORE BOLTING IN PLACE
LOUVER-DR. C-1701-23A
RAIN SHIELD DR. D-1701-31
SCREEN
FASTEN LOUVER TO RAIN SHIELD WITH 6-1/4" ø-20 R.H. MACH. SCREWS.
FASTEN RAIN SHIELD WITH 4-1/4" EXISTING CARRIAGE BOLTS
2-WASHERS USED AS SPACERS (AT BOTTOM ONLY.)
GABLE PANEL

AUTOMATIC GABLE LOUVER & RAIN SHIELD

NO.	REVISION	DATE	CHECKED
2	DELETED ROOF VENTILATOR & GABLE FAN. ADDED NEW LOUVER HOOD AND MOUNTING FRAME	5-28-51	
1	ADDITIONS TO EXHAUST HOOD & GABLE LOUVER	11-1-50	

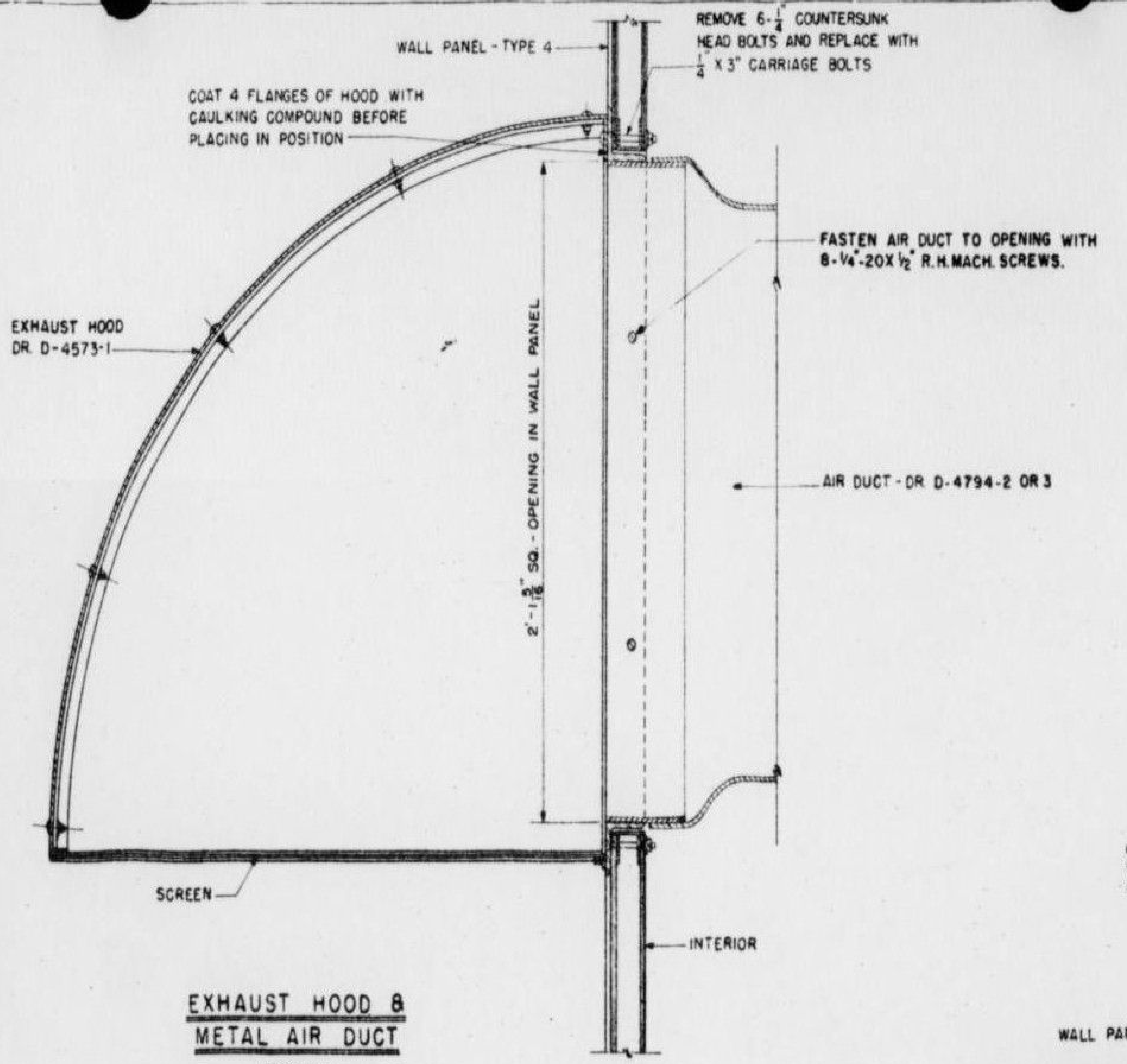
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

MISCELLANEOUS INSTALLATION DETAILS FOR TYPE "S" BUILDINGS

APPROVED: H.O. STRAWN CHIEF, STRUC. & LIGHT ESTAB. BRANCH		SUBMITTED BY: CHIEF OF SECTION
CHECKED:	DESIGNED:	DRAWN: D.S.C.
	TRACED: T.S.S.	DATE: 9-7-49

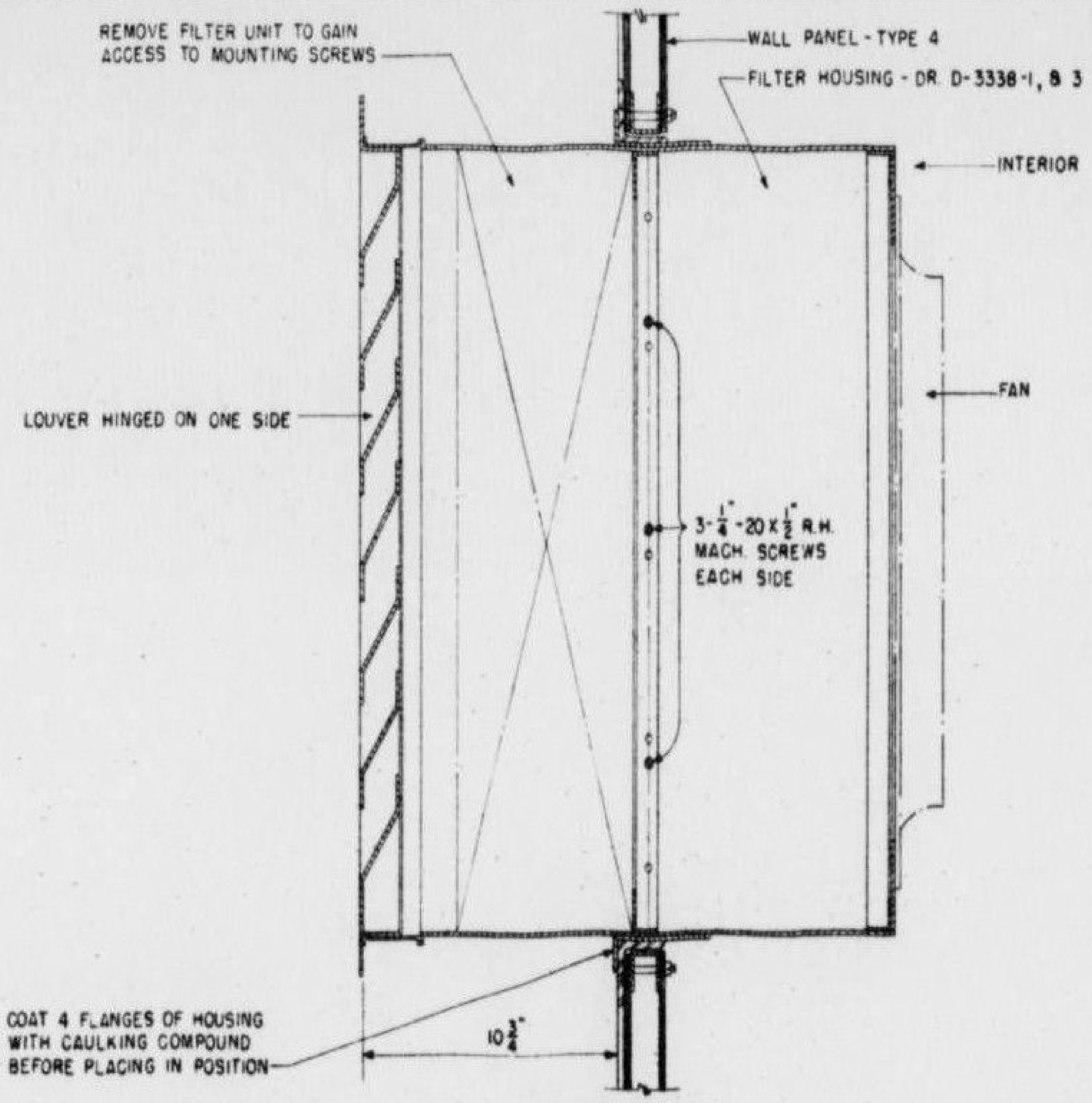
DR. D-1702-12B

SUPERSEDES DWGS. D-1702-11, & 12


WALL PANEL - TYPE 4
REMOVE 6-$\frac{1}{4}$" COUNTERSUNK HEAD BOLTS AND REPLACE WITH $\frac{1}{4}$" X 3" CARRIAGE BOLTS
COAT 4 FLANGES OF HOOD WITH CAULKING COMPOUND BEFORE PLACING IN POSITION
FASTEN AIR DUCT TO OPENING WITH 8-1/4"-20X1/2" R.H.MACH. SCREWS.
EXHAUST HOOD DR. D-4573-1
2'-1$\frac{3}{16}$" SQ. - OPENING IN WALL PANEL
AIR DUCT - DR. D-4794-2 OR 3
SCREEN
INTERIOR

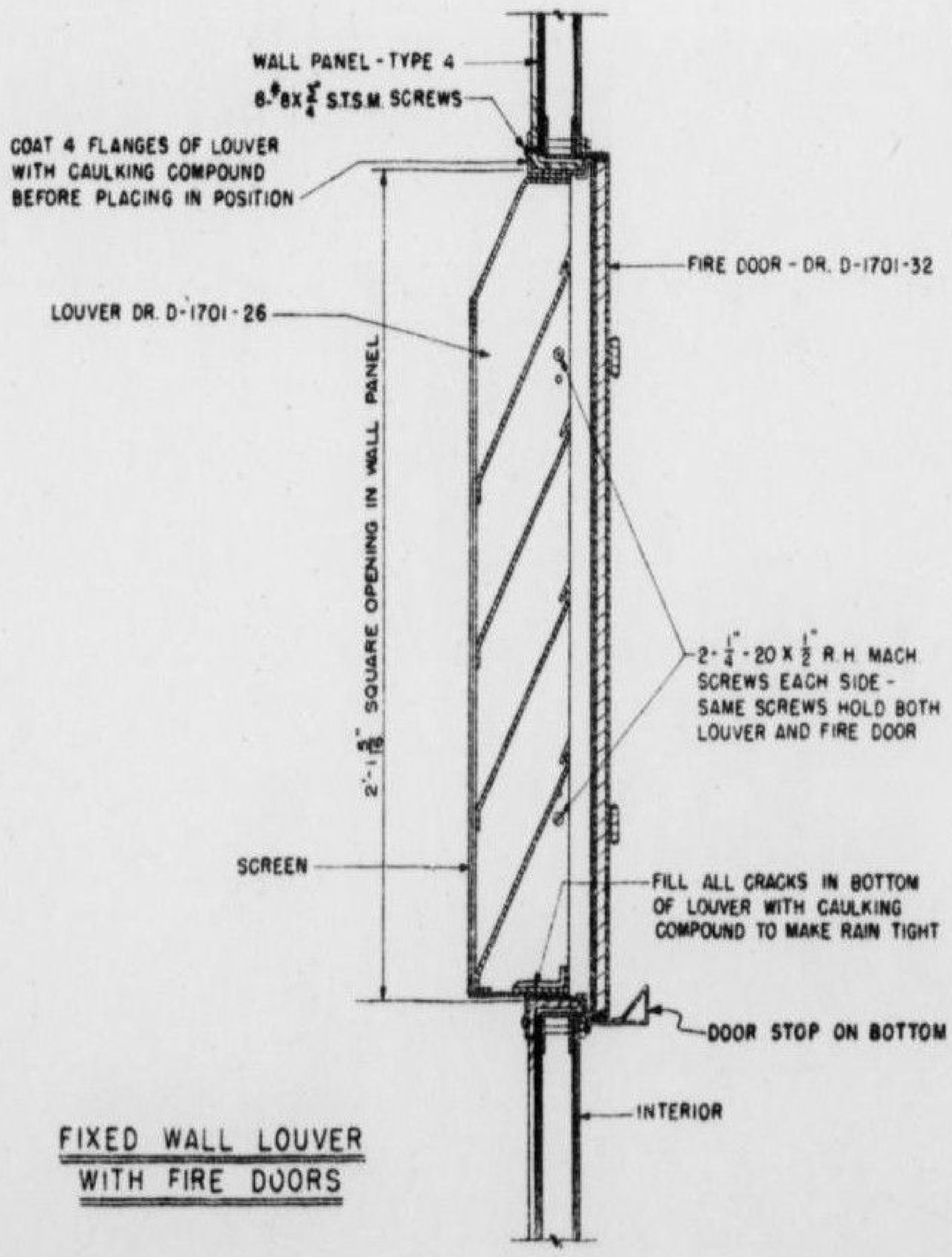
EXHAUST HOOD & METAL AIR DUCT

(SMALL)

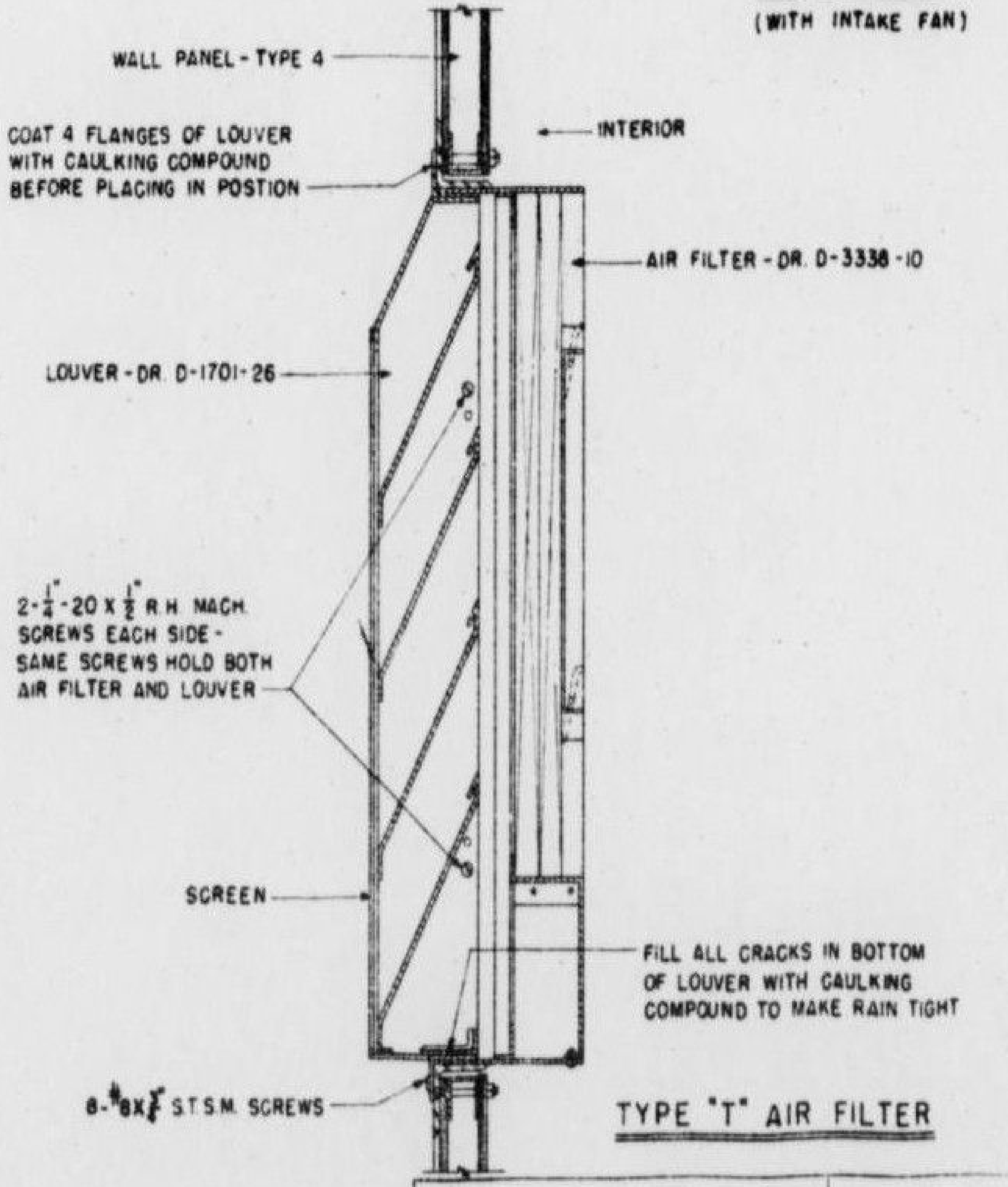

REMOVE FILTER UNIT TO GAIN ACCESS TO MOUNTING SCREWS
WALL PANEL - TYPE 4
FILTER HOUSING - DR. D-3338-1, & 3
INTERIOR
FAN
LOUVER HINGED ON ONE SIDE
3-$\frac{1}{4}$"-20 X $\frac{1}{2}$" R.H. MACH. SCREWS EACH SIDE
COAT 4 FLANGES OF HOUSING WITH CAULKING COMPOUND BEFORE PLACING IN POSITION
10$\frac{3}{4}$"

UNIT AIR FILTER

(WITH INTAKE FAN)


WALL PANEL - TYPE 4
8-#8X$\frac{3}{4}$ S.T.S.M. SCREWS
COAT 4 FLANGES OF LOUVER WITH CAULKING COMPOUND BEFORE PLACING IN POSITION
FIRE DOOR - DR. D-1701-32
LOUVER DR. D-1701-26
2'-1$\frac{3}{16}$" SQUARE OPENING IN WALL PANEL
2-$\frac{1}{4}$"-20 X $\frac{1}{2}$" R.H. MACH SCREWS EACH SIDE - SAME SCREWS HOLD BOTH LOUVER AND FIRE DOOR
SCREEN
FILL ALL CRACKS IN BOTTOM OF LOUVER WITH CAULKING COMPOUND TO MAKE RAIN TIGHT
DOOR STOP ON BOTTOM
INTERIOR

FIXED WALL LOUVER WITH FIRE DOORS


WALL PANEL - TYPE 4
INTERIOR
COAT 4 FLANGES OF LOUVER WITH CAULKING COMPOUND BEFORE PLACING IN POSTION
AIR FILTER - DR. D-3338-10
LOUVER - DR. D-1701-26
2-$\frac{1}{4}$"-20 X $\frac{1}{2}$" R.H. MACH. SCREWS EACH SIDE - SAME SCREWS HOLD BOTH AIR FILTER AND LOUVER
SCREEN
FILL ALL CRACKS IN BOTTOM OF LOUVER WITH CAULKING COMPOUND TO MAKE RAIN TIGHT
8-#8X$\frac{3}{4}$ S.T.S.M. SCREWS

TYPE "T" AIR FILTER

NO.	REVISION	DATE	CHECKED
1	ADDED NEW AIR DUCT & REF NOS. TO EXHAUST HOOD	5-28-51	

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

MISCELLANEOUS INSTALLATION DETAILS FOR TYPE "S" BUILDINGS

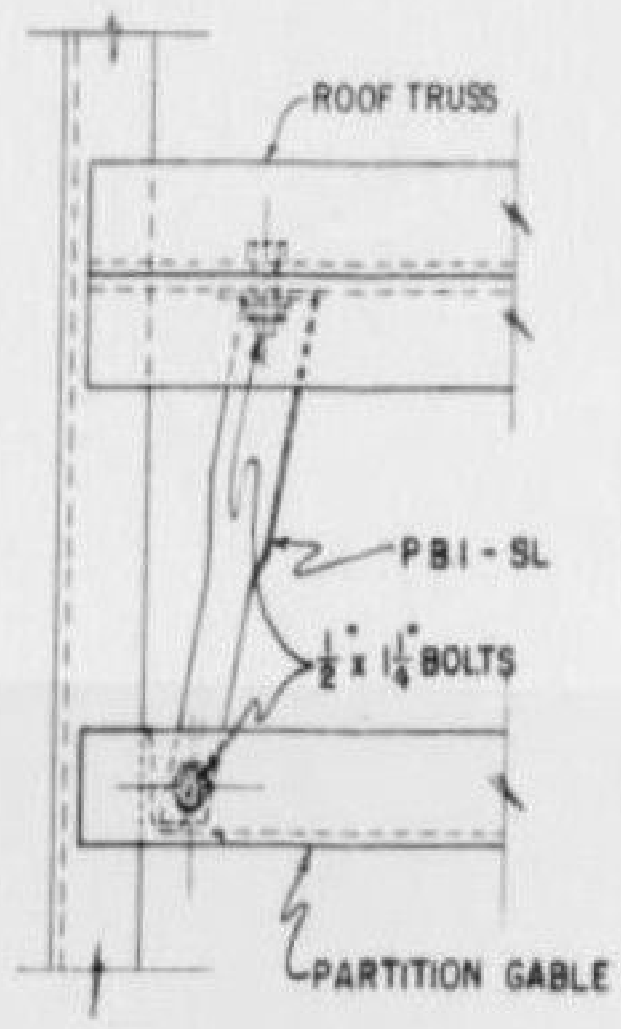
APPROVED
H. O. STRAWN
CHIEF, STRUC. & LIGHT ESTAB. BRANCH

SUBMITTED BY
CHIEF OF SECTION

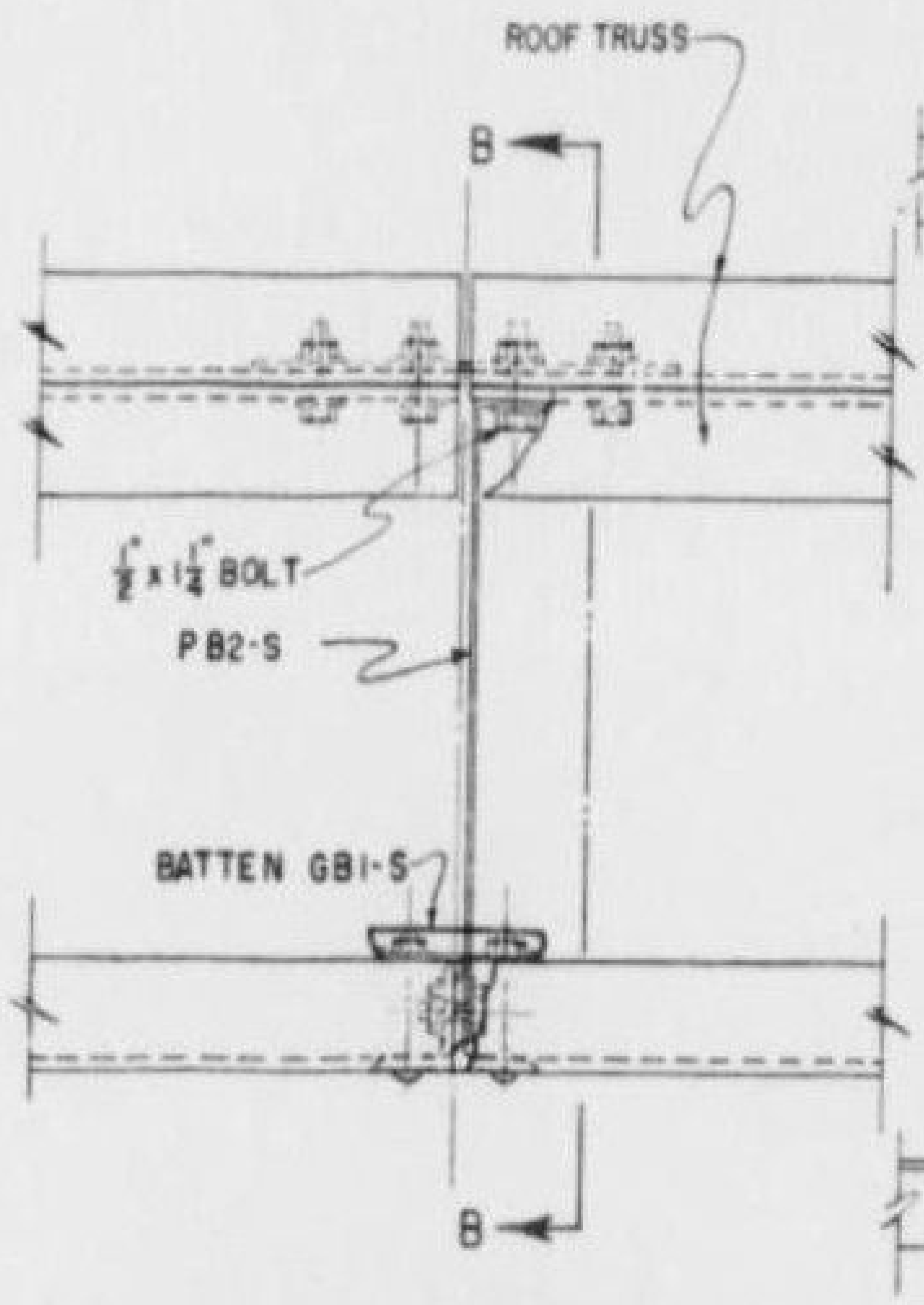
D.G.C.
E.W.G. DATE 9-7-49

DR. D-1702-12C

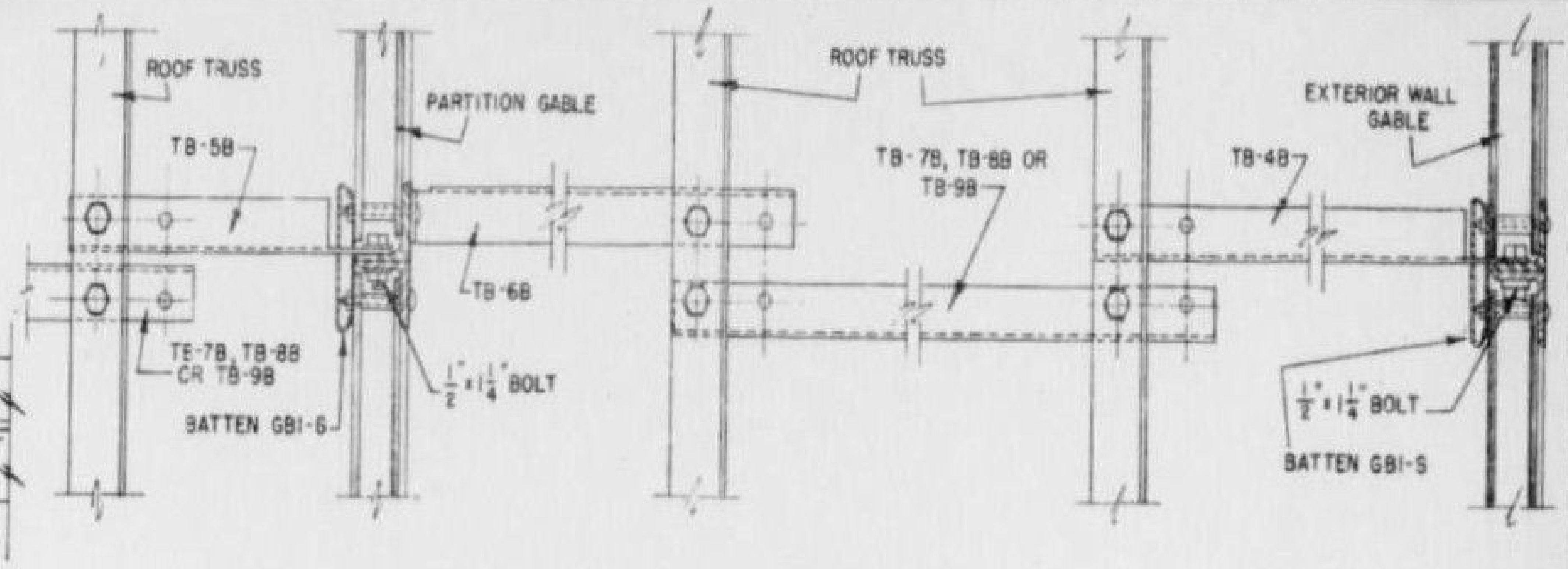
SUPERSEDES DR. D-1702-12



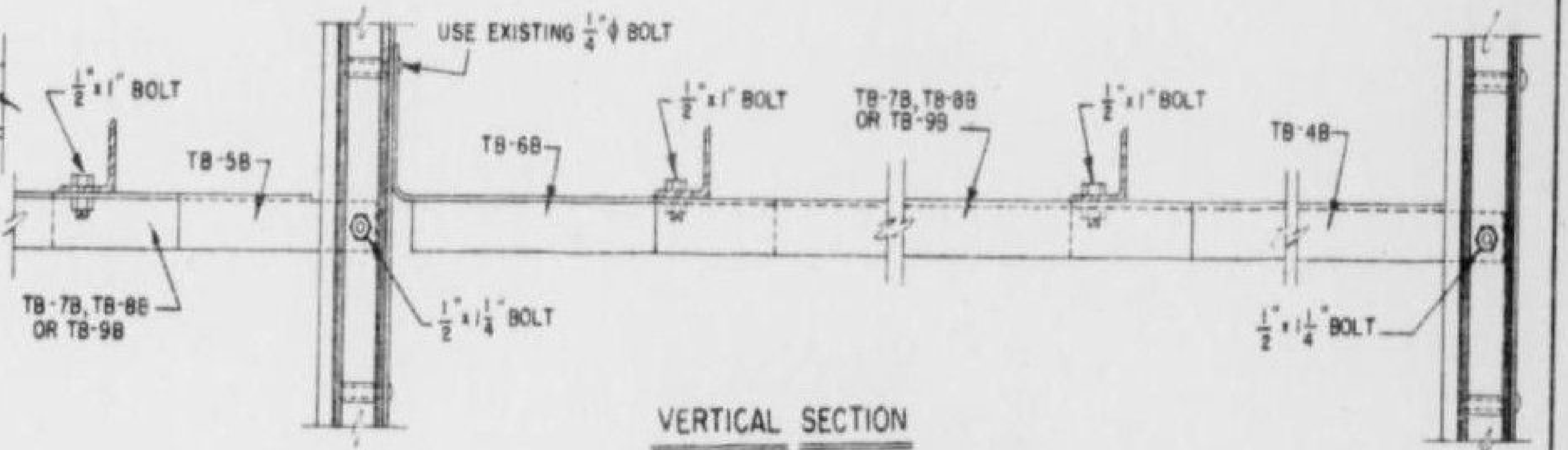
EAVE PLAN
ROOF REMOVED



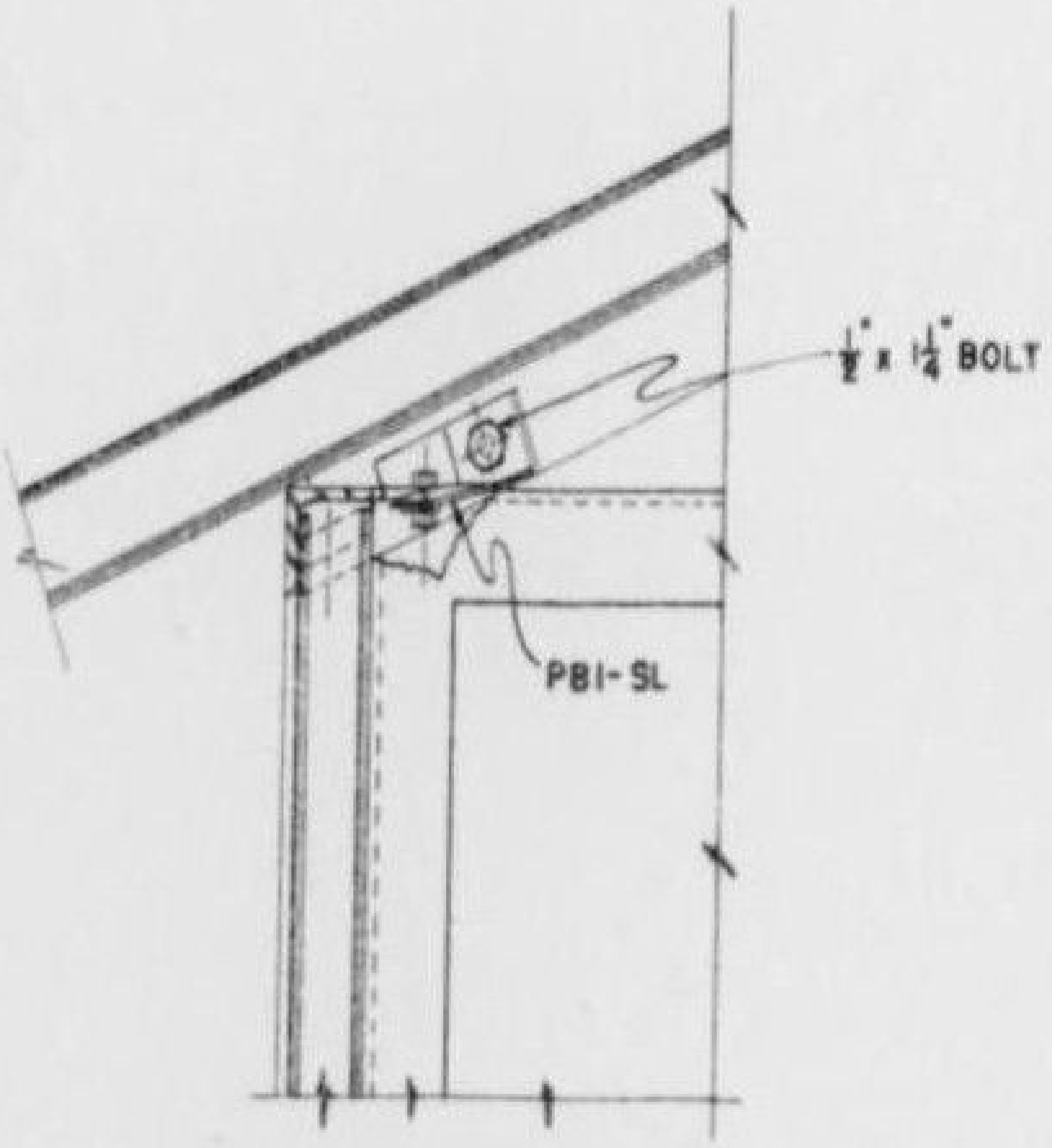
RIDGE PLAN AT BLDG ℄
ROOF REMOVED



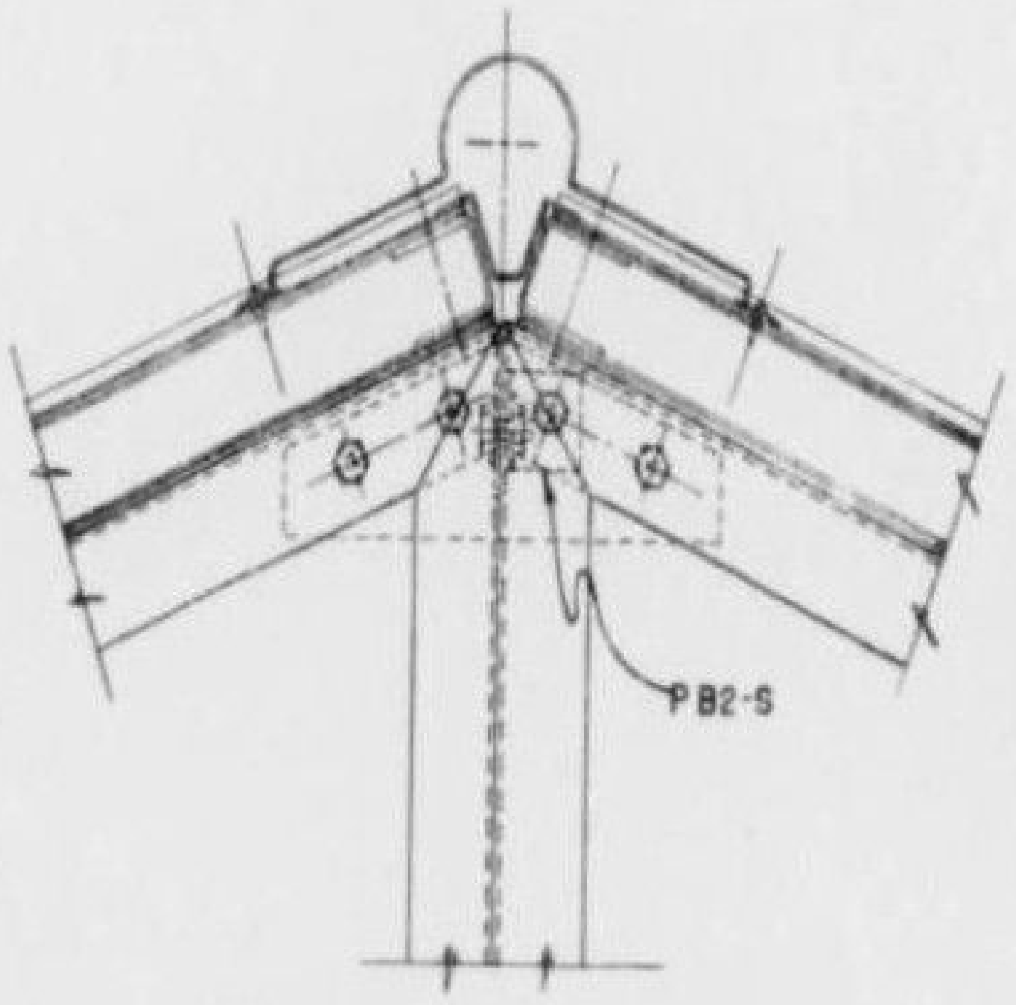
PLAN



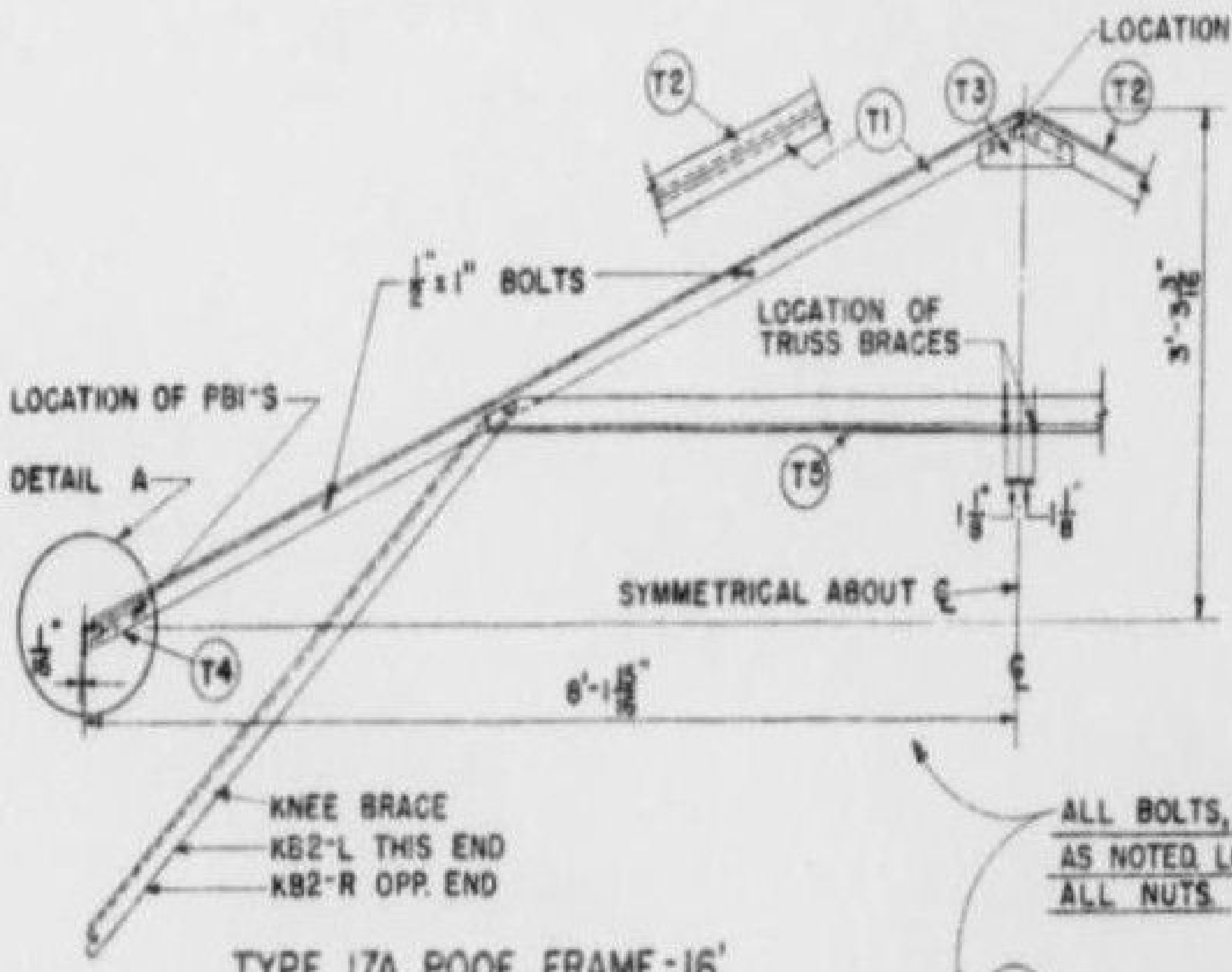
VERTICAL SECTION



SECTIONAL ELEVATION

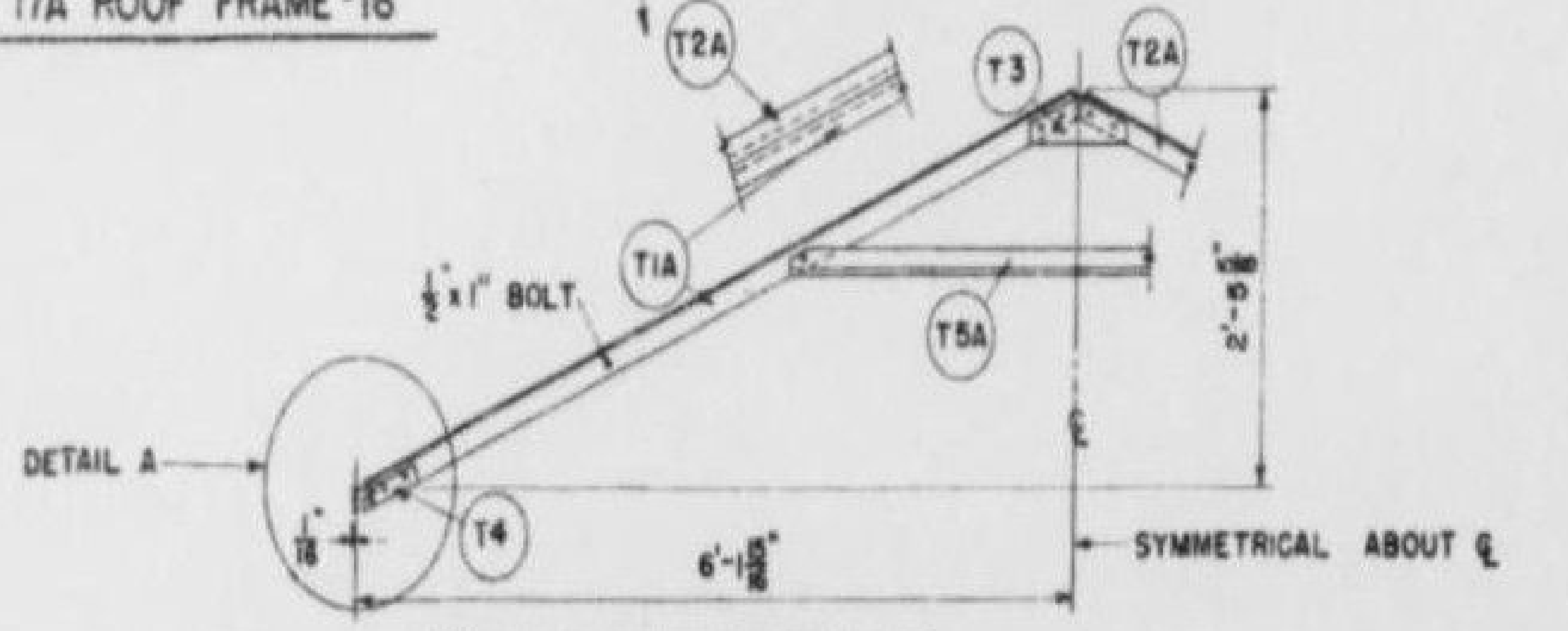


SECTIONAL ELEVATION

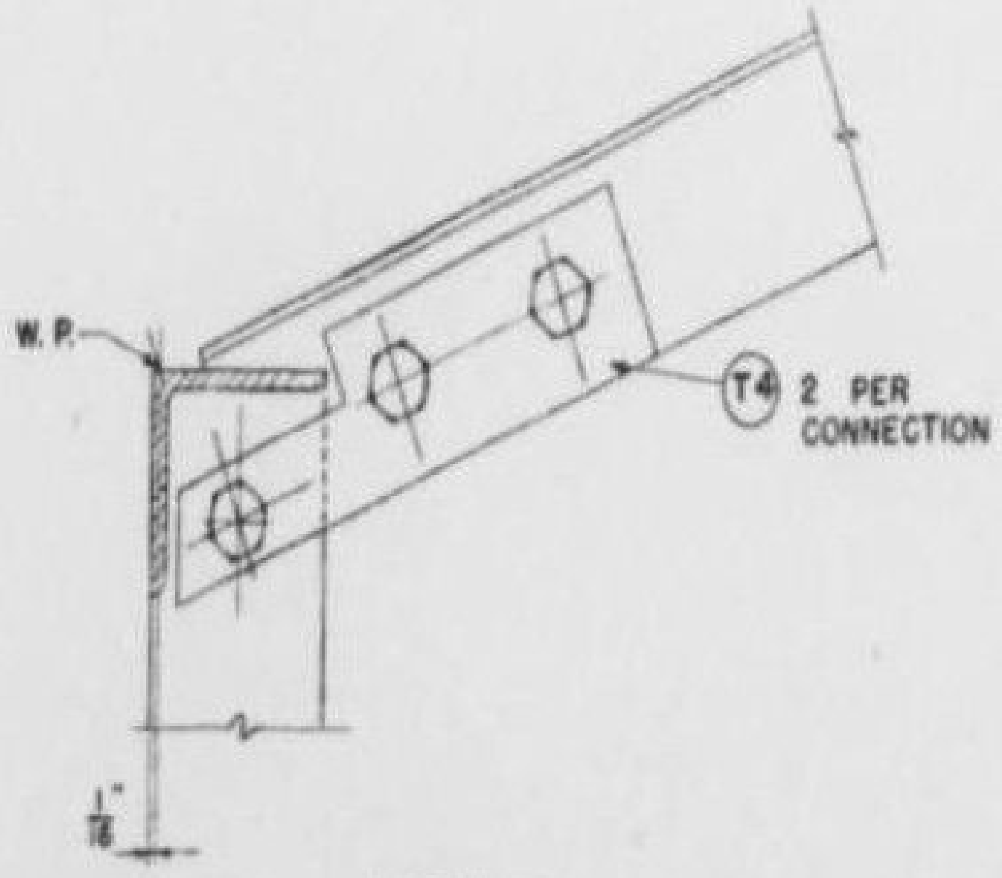


TYPE 17A ROOF FRAME-16'

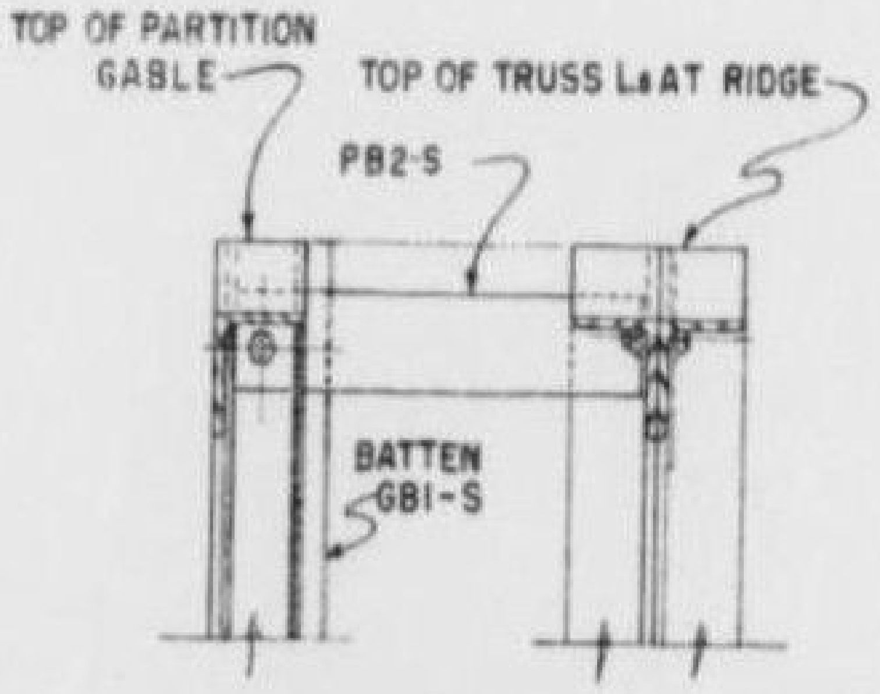
ALL BOLTS, 1/2"x1 1/2" LG., EXCEPT AS NOTED. LOCKWASHERS UNDER ALL NUTS.



TYPE 18A ROOF FRAME 12'



DETAIL A



SECTION B-B

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
AIR NAVIGATION FACILITIES SERVICE

SECTIONAL STEEL FRAME BLDG.
TYPICAL ERECTION DETAILS

NO.	REVISION	DATE	CHECKED
2	DELECTED NOTES-ADDED TRUSSES 17A & 18A	3-8-50	HRG
1.	PLAN & VERT. SECTION REVISED	4-3-47	HRG

APPROVED H. W. HOWARD
CIVIL AIRWAYS ENGINEERING DIVISION

SUBMITTED BY
CHIEF OF SECTION

CHECKED
H.O.H.

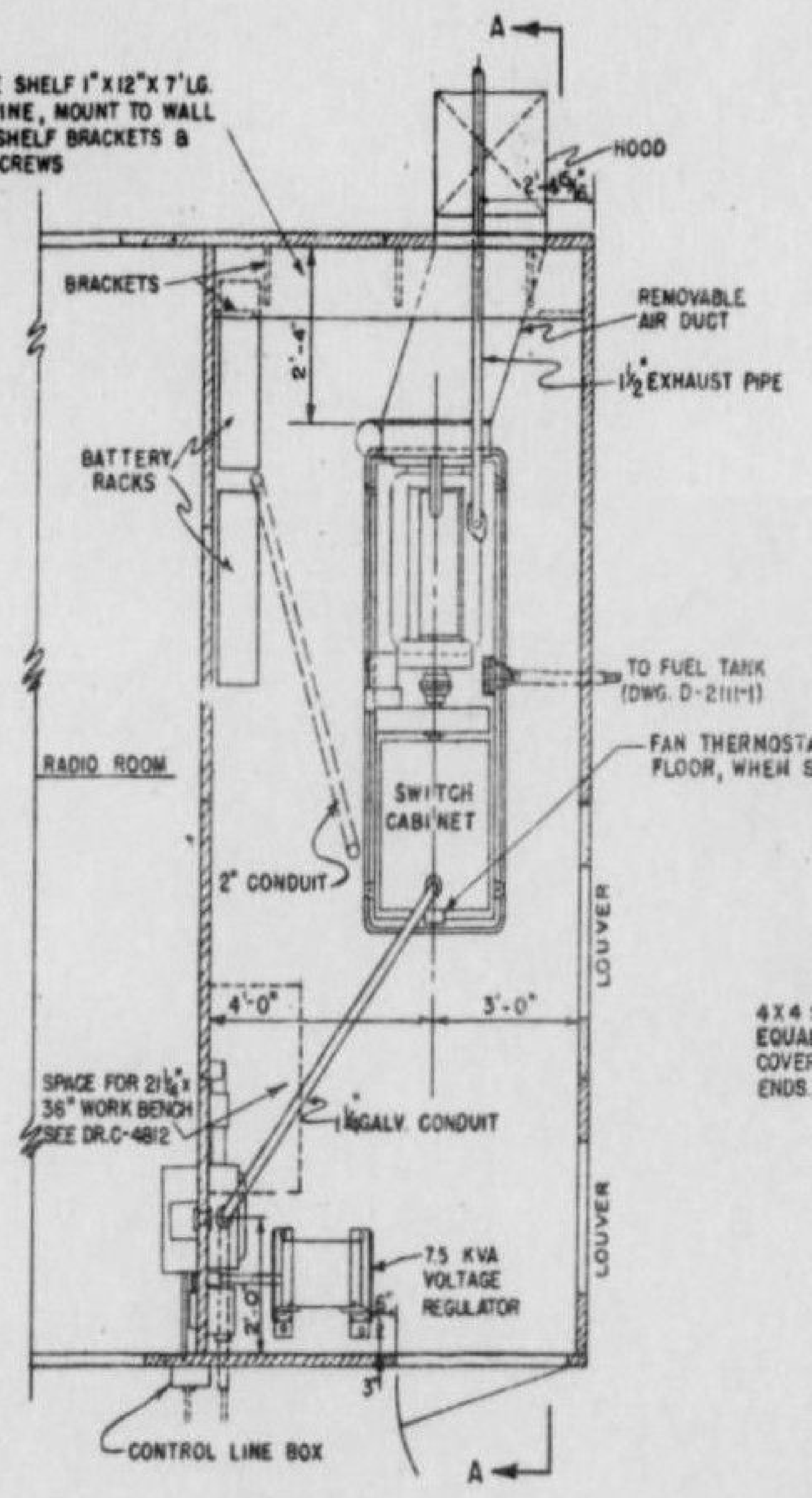
DESIGNED

DRAWN J.H.S.

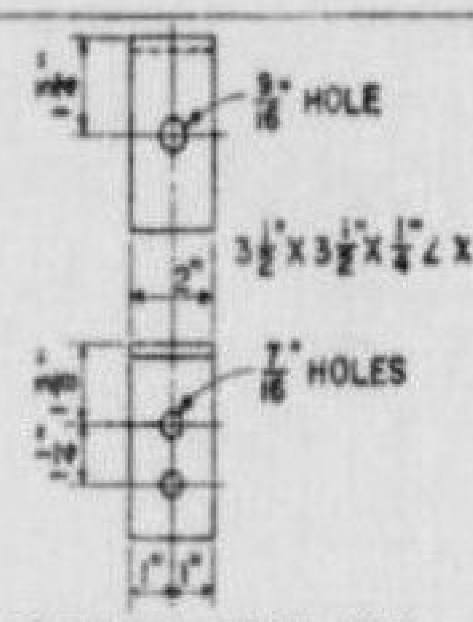
TRACED T.G.S.

DATE 12-20-46

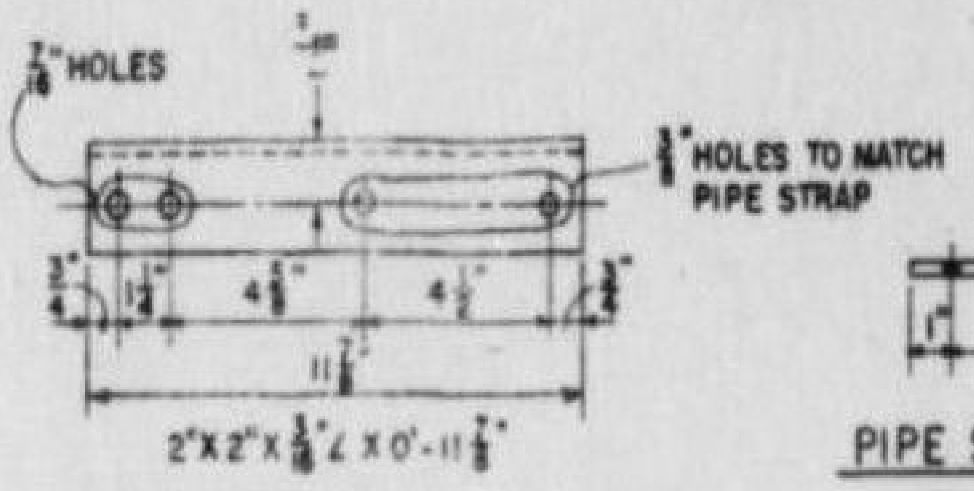
DR. D-1702-10A


STORAGE SHELF 1"X12"X 7'LG. WHITE PINE, MOUNT TO WALL WITH 5 SHELF BRACKETS & WOOD SCREWS
HOOD
BRACKETS
REMOVABLE AIR DUCT
$1\frac{1}{2}$" EXHAUST PIPE
BATTERY RACKS
TO FUEL TANK (DWG. D-2111-1)
FAN THERMOSTAT 5 FT. ABOVE FLOOR, WHEN SPECIFIED
SWITCH CABINET
RADIO ROOM
2" CONDUIT
LOUVER
4'-0"
3'-0"
SPACE FOR 21" X 36" WORK BENCH SEE DR.C-4812
$1\frac{1}{4}$" GALV. CONDUIT
7.5 KVA VOLTAGE REGULATOR
CONTROL LINE BOX
A

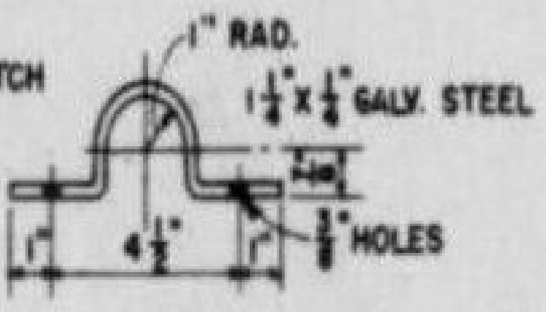
PLAN
FIG. 1



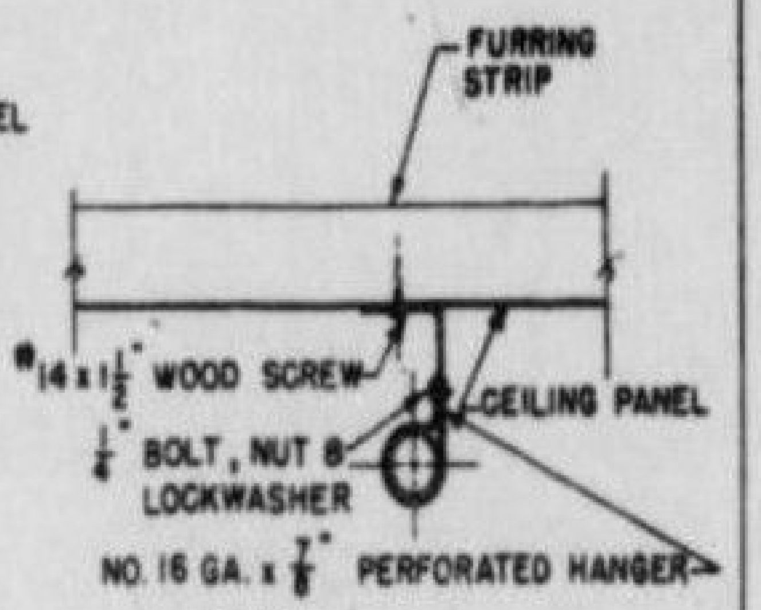
CLIP ANGLE MARK EX 1
1 REQ.


$\frac{7}{16}$" HOLES
$\frac{3}{8}$" HOLES TO MATCH PIPE STRAP
$4\frac{1}{2}$"
2"x2"x$\frac{1}{4}$"∠ x 0'-$11\frac{1}{2}$"

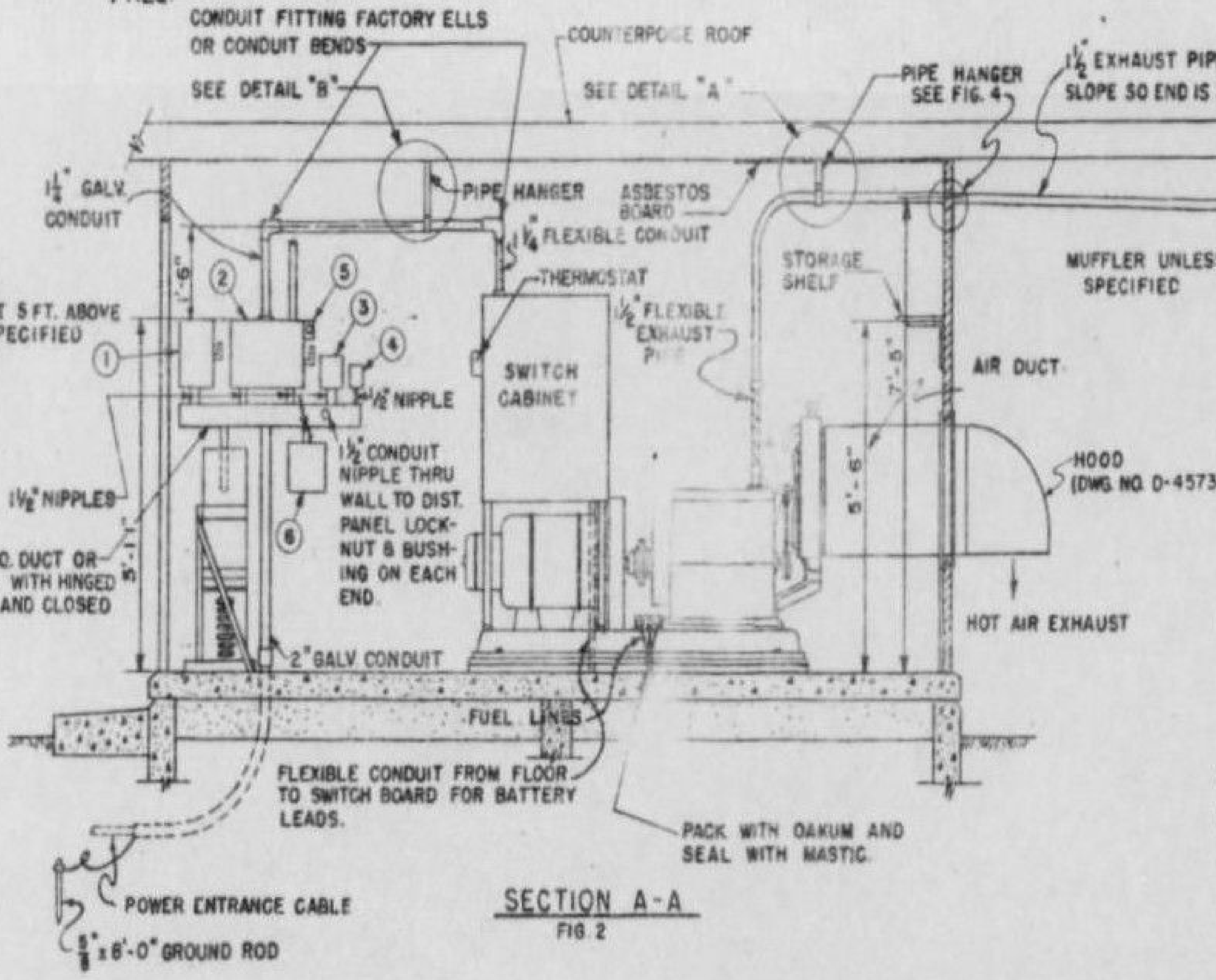
EXHAUST SUPPORT MARK EX 2
1 REQ.



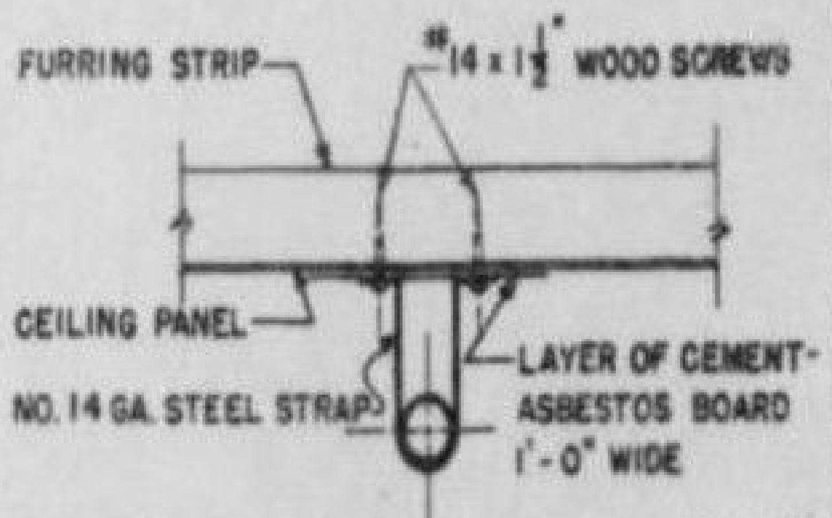
PIPE STRAP MARK EX 3
1 REQ.


FURRING STRIP
#14 x $1\frac{1}{2}$" WOOD SCREW
CEILING PANEL
$\frac{1}{4}$" BOLT, NUT & LOCKWASHER
NO. 16 GA. x $\frac{7}{8}$" PERFORATED HANGER

DETAIL B


CONDUIT FITTING FACTORY ELLS OR CONDUIT BENDS
COUNTERPOISE ROOF
SEE DETAIL "B"
SEE DETAIL "A"
PIPE HANGER SEE FIG. 4
$1\frac{1}{2}$" EXHAUST PIPE SLOPE SO END IS 3" LOWER THAN BEND
$1\frac{1}{2}$" GALV. CONDUIT
PIPE HANGER
ASBESTOS BOARD
$1\frac{1}{4}$" FLEXIBLE CONDUIT
THERMOSTAT
$1\frac{1}{2}$" FLEXIBLE EXHAUST PIPE
STORAGE SHELF
AIR DUCT
SWITCH CABINET
$\frac{1}{2}$" NIPPLE
$1\frac{1}{2}$" CONDUIT NIPPLE THRU WALL TO DIST. PANEL LOCK-NUT & BUSHING ON EACH END.
$1\frac{1}{2}$" NIPPLES
4 X 4 SQ. DUCT OR EQUAL WITH HINGED COVER AND CLOSED ENDS.
2" GALV. CONDUIT
FUEL LINES
HOOD (DWG. NO. D-4573-1
HOT AIR EXHAUST
5'-6"
FLEXIBLE CONDUIT FROM FLOOR TO SWITCH BOARD FOR BATTERY LEADS.
PACK WITH OAKUM AND SEAL WITH MASTIC.
POWER ENTRANCE CABLE
$\frac{5}{8}$" x 8'-0" GROUND ROD
$\frac{1}{2}$" x 1" BOLT, GALV., DRILL $\frac{9}{16}$" HOLE IN C.
CLIP ANGLE EX1.
EXHAUST SUPPORT EX 2, 2-BOLTS $\frac{3}{8}$" x 1", GALV.
MUFFLER UNLESS OTHERWISE SPECIFIED
PIPE STRAP EX 3, 2-BOLTS $\frac{5}{16}$" x 1", GALV.
1
2
3
4
5
6

SECTION A-A
FIG. 2


FURRING STRIP
#14 x $1\frac{1}{2}$" WOOD SCREWS
CEILING PANEL
LAYER OF CEMENT-ASBESTOS BOARD 1'-0" WIDE
NO. 14 GA. STEEL STRAP

DETAIL A

EQUIPMENT AT POWER ENTRANCE

① ENTRANCE SWITCH

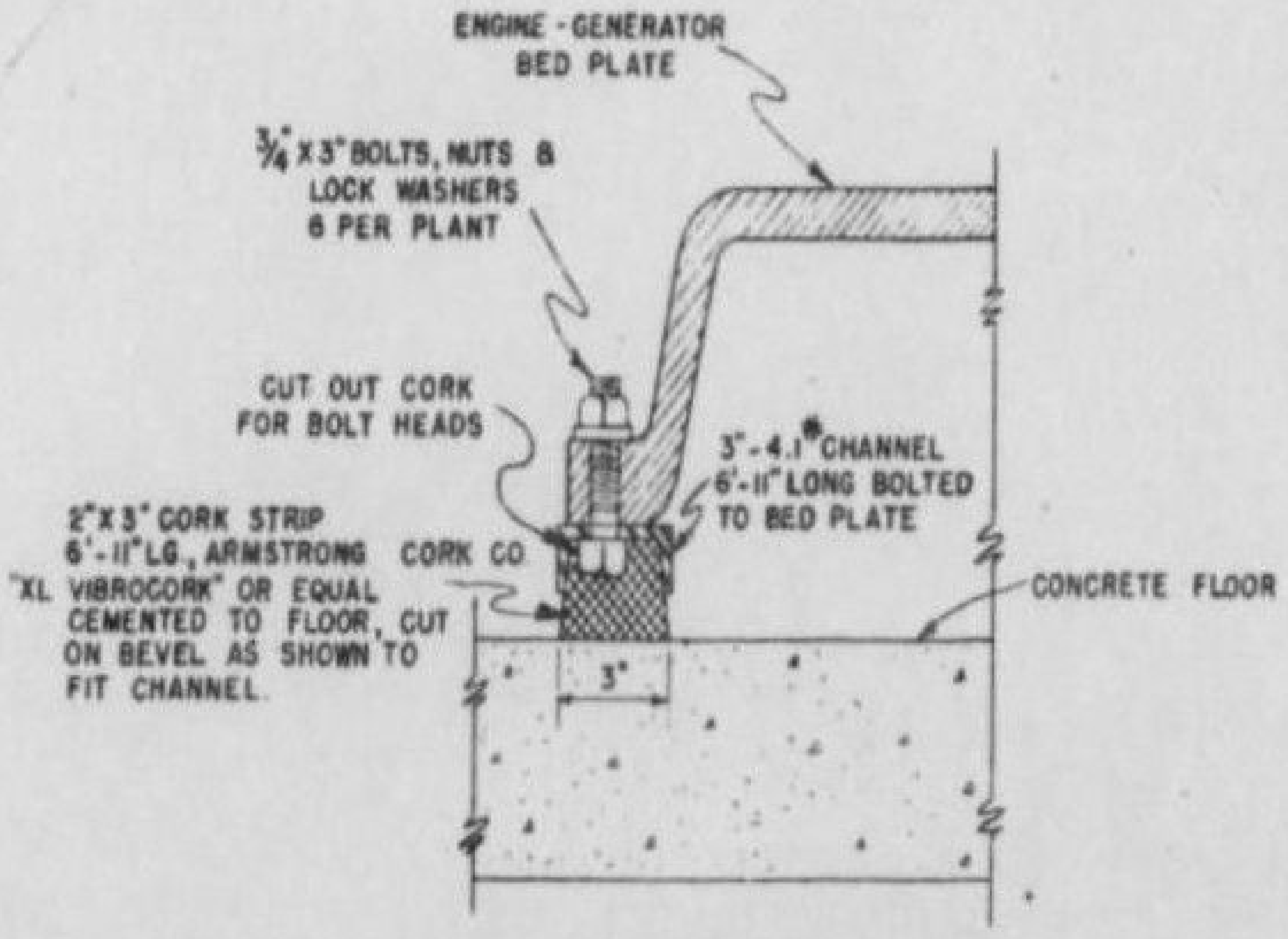
② 4 PDT 60 AMP. ISOLATION SWITCH

③ DME POWER RELAY STRUTHERS-DUNN #84-BXB IN H11 BOX OR EQUAL.

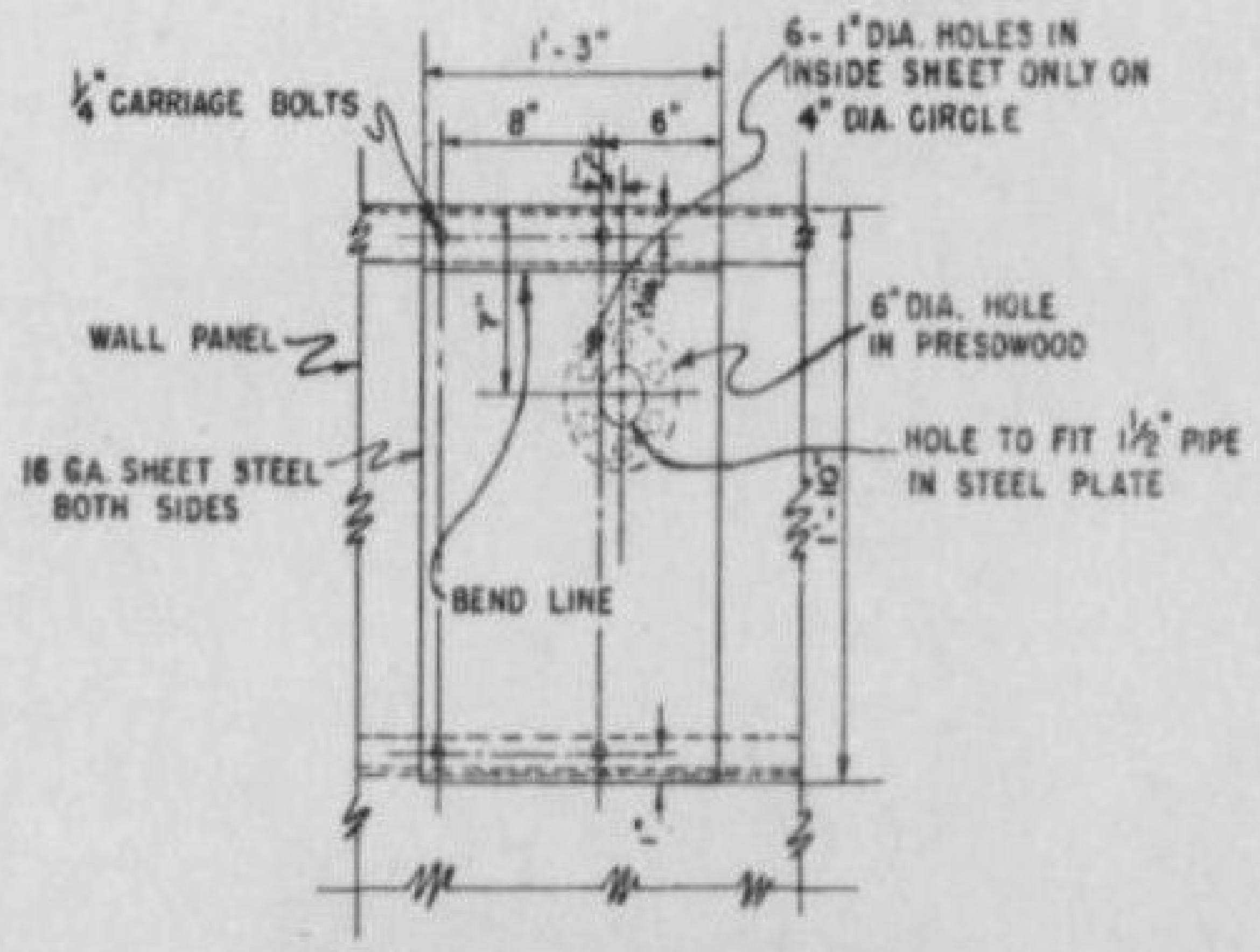
④ DME AUXILIARY RELAY WARD LEONARD 105-7511 OR EQUAL.

⑤ INDICATING LIGHT

⑥ 1-2P-250 V. FUSE BLOCKS IN 9"X9"X4" CABINET MARK "REGULATOR FUSES"


ENGINE-GENERATOR BED PLATE
$\frac{3}{4}$" X 3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
CUT OUT CORK FOR BOLT HEADS
3"-4.1# CHANNEL 6'-11" LONG BOLTED TO BED PLATE
2"X3" CORK STRIP 6'-11" LG., ARMSTRONG CORK CO. "XL VIBROCORK" OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN TO FIT CHANNEL.
CONCRETE FLOOR
3"

ENGINE MOUNTING DETAIL
FIG. 3.


1'-3"
8"
6"
$\frac{1}{4}$" CARRIAGE BOLTS
6-1" DIA. HOLES IN INSIDE SHEET ONLY ON 4" DIA. CIRCLE
WALL PANEL
6" DIA. HOLE IN PRESDWOOD
HOLE TO FIT $1\frac{1}{2}$" PIPE IN STEEL PLATE
16 GA. SHEET STEEL BOTH SIDES
BEND LINE

WALL PLATE FOR EXHAUST PIPE
TWO REQUIRED, ONE AS SHOWN AND ONE WITHOUT BEND FOR INSIDE WALL
FIG. 4

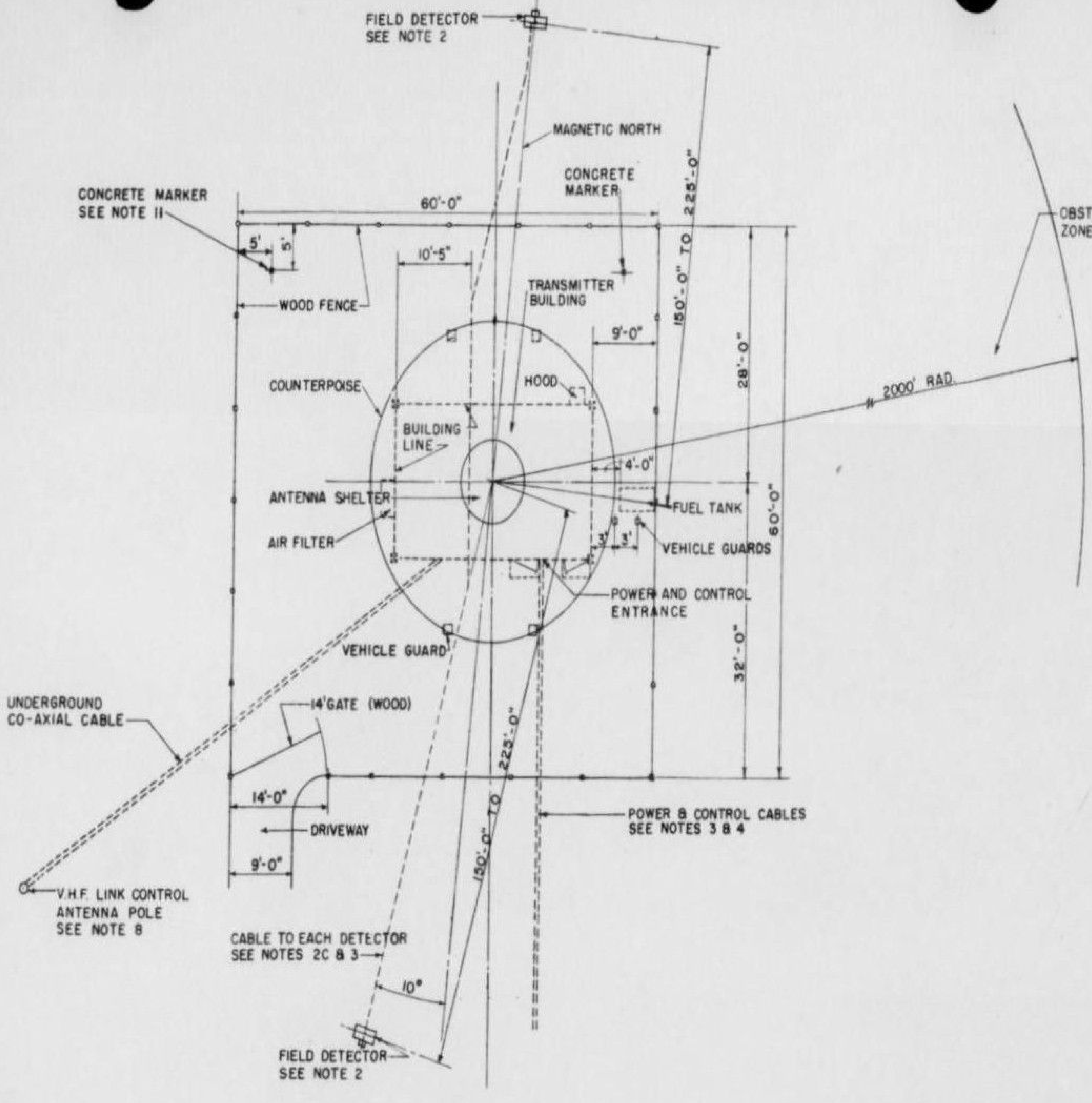
NOTE:
FOR LIGHTING AND COMPLETE CONDUIT LAYOUT OF BUILDING SEE DRAWING D-1702-48A

NO.	REVISION	DATE	CHECKED
5	ADDED REG. FUSE BOX	11-26-51	
4	ADDED WORK BENCH	10-1-51	
3	ADDED SQ. DUCT AT POWER ENTRANCE	7-31-51	
2	EXHAUST SUPPORT EXTENDED	10-23-50	
1	FOLDING WORK BENCH DELETED, STORAGE SHELF CHANGED	7-21-50	

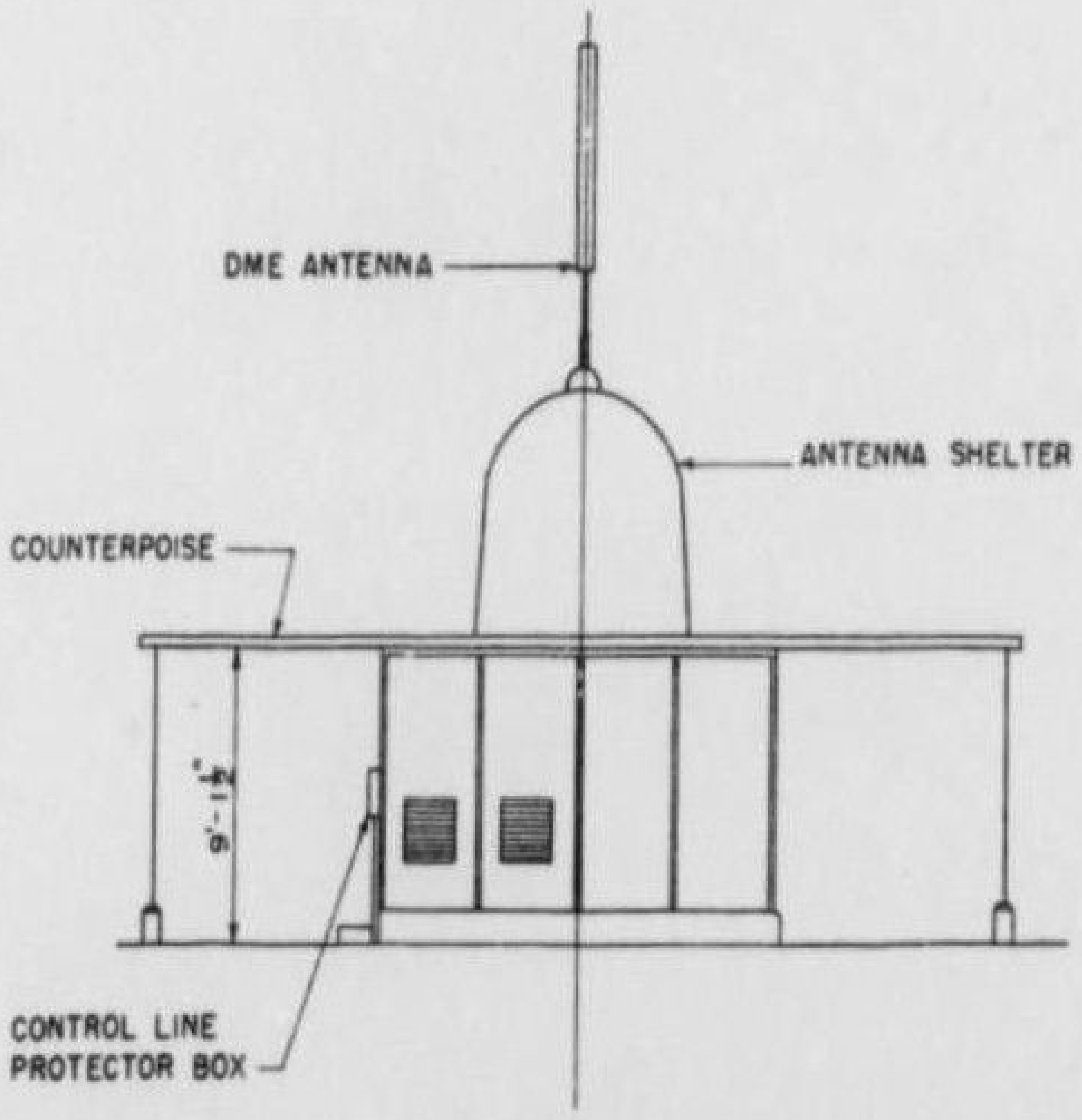
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
16'x 28' TYPE "S" BLDG WITH COUNTERPOISE ROOF
8 KVA ENG.-GEN. LAYOUT

APPROVED:
A.J. ALPHER
CHIEF, STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY:
CHIEF OF SECTION
CHECKED:
DESIGNED:
DRAWN: F.S.K.
TRACED: F.S.K.
DATE: 3-31-50
DR. D-3317-36


FIELD DETECTOR SEE NOTE 2
MAGNETIC NORTH
CONCRETE MARKER SEE NOTE 11
CONCRETE MARKER
60'-0"
5'
5'
10'-5"
225'-0"
150'-0" TO
TRANSMITTER BUILDING
WOOD FENCE
OBSTRUCTION RESTRICTION ZONE - SEE NOTE 6
9'-0"
28'-0"
COUNTERPOISE
HOOD
2000' RAD.
BUILDING LINE
4'-0"
ANTENNA SHELTER
FUEL TANK
60'-0"
AIR FILTER
3'
3'
VEHICLE GUARDS
POWER AND CONTROL ENTRANCE
VEHICLE GUARD
32'-0"
UNDERGROUND CO-AXIAL CABLE
14' GATE (WOOD)
14'-0"
DRIVEWAY
9'-0"
POWER & CONTROL CABLES SEE NOTES 3 & 4
V.H.F. LINK CONTROL ANTENNA POLE SEE NOTE 8
CABLE TO EACH DETECTOR SEE NOTES 2C & 3
10°
FIELD DETECTOR SEE NOTE 2

PLAN



END ELEVATION

NOTES

1. FOR LOCATION OF BUILDING ON LEASED PLOT, POLE LINES, AND SPECIFIC LAYOUT, SEE INDIVIDUAL SITE PLOT LAYOUT.
2. FIELD DETECTORS
   - A. ONE FIELD DETECTOR SHALL BE INSTALLED ON MAGNETIC NORTH MERIDIAN, AND THE OTHER FIELD DETECTOR ON MAGNETIC AZIMUTH OF 190 DEGREES OR 170 DEGREES
   - B. MOUNT FIELD DETECTORS ON POLES (8 FT. MIN. HEIGHT) AT SUCH HEIGHT SO THEY ARE IN LINE OF SIGHT (CLEARING COUNTERPOISE) TO ANTENNA.
   - C. PROVIDE TWO RG-22/U CABLES OR ONE RG-22/U AND ONE 2/C #14 CABLE TO EACH FIELD DETECTOR.
3. ALL UNDERGROUND CABLE TO BE BURIED 18" DEEP EXCEPT CABLE LAID UNDER DRIVE AND OFF THE LEASED AREA TO BE BURIED 36" DEEP.
4. POWER AND CONTROL CABLES MAY BE LAID IN SAME TRENCH PROVIDED 12" MIN. HORIZONTAL SEPARATION IS MAINTAINED.
5. POWER AND CONTROL LINES:
   - A. POWER AND CONTROL EXTENSIONS SHALL BE INSTALLED UNDERGROUND FOR A MINIMUM DISTANCE OF 250' FROM THE ANTENNA AND IN ORDER TO MAINTAIN A MINIMUM VOLTAGE DROP THE UNDERGROUND CABLE RUN TO THE TERMINAL POLE SHALL NOT EXCEED 750'.
   - B. POWER AND CONTROL POLE LINES TO SITE WITHIN 1200' FT. OF ANTENNA SHALL BE ON RADIAL LINE FROM CENTER OF ANTENNA.
   - C. TERMINATE POWER CABLE ON POWER COMPANY'S TERMINAL POLE WHERE POWER COMPANY WILL ALLOW CONSTRUCTION ON THEIR POLE, OTHERWISE TERMINATE ON GOVERNMENT PLACED TERMINAL POLE.
   - D. LOCATION OF TERMINAL POLES AND OVERHEAD LINES IN VICINITY SHALL BE SHOWN ON ALL SITE PLANS.
   - E. POWER COMPANY ENDS CONSTRUCTION AT TERMINAL POLE. TELEPHONE COMPANY ENDS CONSTRUCTION IN PROTECTOR BOX ON EXTERIOR OF BUILDING.
6. SECURE PERMIT TO CLEAR, IF NECESSARY, ALL OBSTRUCTIONS AS INDICATED IN MANOP V-A-5
7. DIRECTION OF APPROACH OF ACCESS ROAD TO BE LOCATED TO FIT EACH SITE.
8. WHEN VHF-FM LINK CONTROL IS REQUIRED REFER TO DWG. D-4682 FOR ANTENNA INSTALLATION ON POLE.
9. SURFACE ENTIRE FENCED AREA.
10. VEHICLES WHICH CAN NOT BE PARKED UNDER COUNTERPOISE ARE TO BE PARKED AS CLOSE TO BUILDINGS AND AS FAR UNDER COUNTERPOISE AS POSSIBLE.
11. THESE MARKERS ARE FOR USE IN CONNECTION WITH THEODOLITE CHECKS. THE SITE DRAWING SHALL SHOW THE TRUE BEARING BETWEEN THE MARKERS AND THE TRUE BEARING FROM EACH MARKER TO THE NORTH FIELD DETECTOR.

REFERENCE DRAWINGS

D-4745	BOARD FENCE
D-1701-2AC	BUILDING PLAN AND ELEVATION
C-1701-23-E	WOOD FRAME FOR MOUNTING GABLE LOUVER
D-1701-10	BUILDING PANEL JOINT DETAILS
D-1702-12C	MISCELLANEOUS INSTALLATION DETAILS
D-1702-48	BUILDING ERECTION
D-1702-48A	BUILDING ELECTRICAL LAYOUT
D-1703-2C	BUILDING FOUNDATION
B-2106-1	TERMINAL POLE DETAILS (GOVERNMENT)
C-2106-2	TERMINAL POLE DETAILS (POWER CO.)
C-2107	DRIVEWAY DETAILS
D-2111-1	515-GALLON FUEL TANK INSTALLATION
D-3317-36	8 KVA ENGINE-GENERATOR INSTALLATION
D-3338-13	2000 CFM FILTER-TYPE TT-INSTALLATION DETAILS
C-4324-40	TYPICAL ROOF LAYOUT - AIR MARKING
C-4404	FIELD DETECTOR POLE
C-4508	ALPHABET, NUMERALS AND SYMBOLS
D-4682	VHF LINK ANTENNA INSTALLATION ON POLE
B-4740	PLASTIC ANTENNA SHELTER
D-4733-1,2,3,4,5,6	COUNTERPOISE INSTALLATION DETAILS - OCTAGONAL FRAMING.
D-4731-1,2,3,4,5,6	COUNTERPOISE INSTALLATION DETAILS - CIRCULAR FRAMING.
B-3317-11	REMOVABLE AIR DUCT

▨ INDICATES SURVEY STAKE

NO.	REVISION	DATE	CHECKED
12	CHANGED NOTE 2C	12-5-52	
11	CHANGED NOTE 5A	7-7-52	WR
10	CHANGED NOTES 2A & 6, NOTE 11 ADDED	4-13-51	KL
9	DIMENSION CHANGED FOR FIELD DETECTOR	3-1-51	KL
8	PLOT SIZE CHANGED	10-17-50	KL
7	REF. DWGS. CHANGED	8-1-50	
6	REDRAWN - WITH MAJOR CHANGES	5-1-50	KL

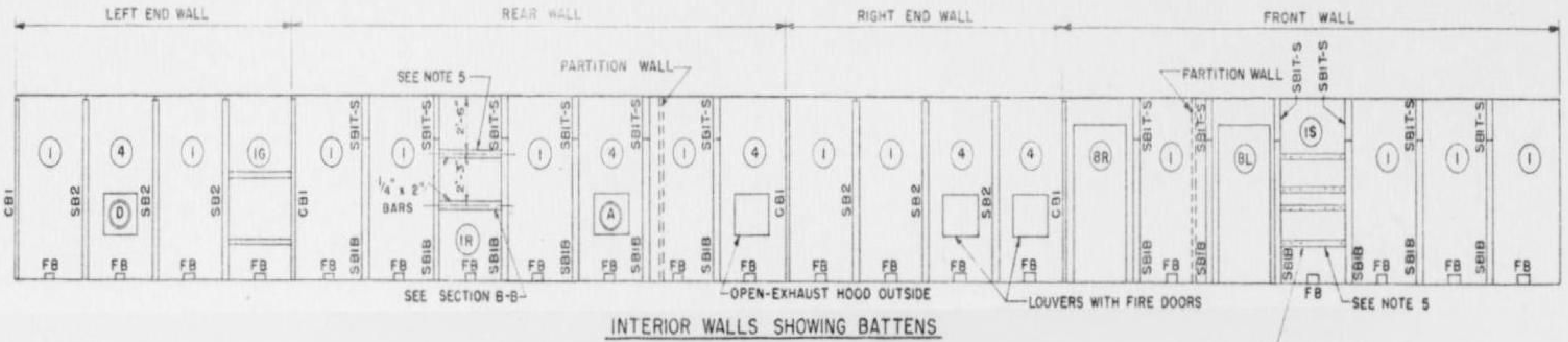
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
16'X28' TYPE "S" BLDG. WITH COUNTERPOISE ROOF
TYPICAL PLOT LAYOUT

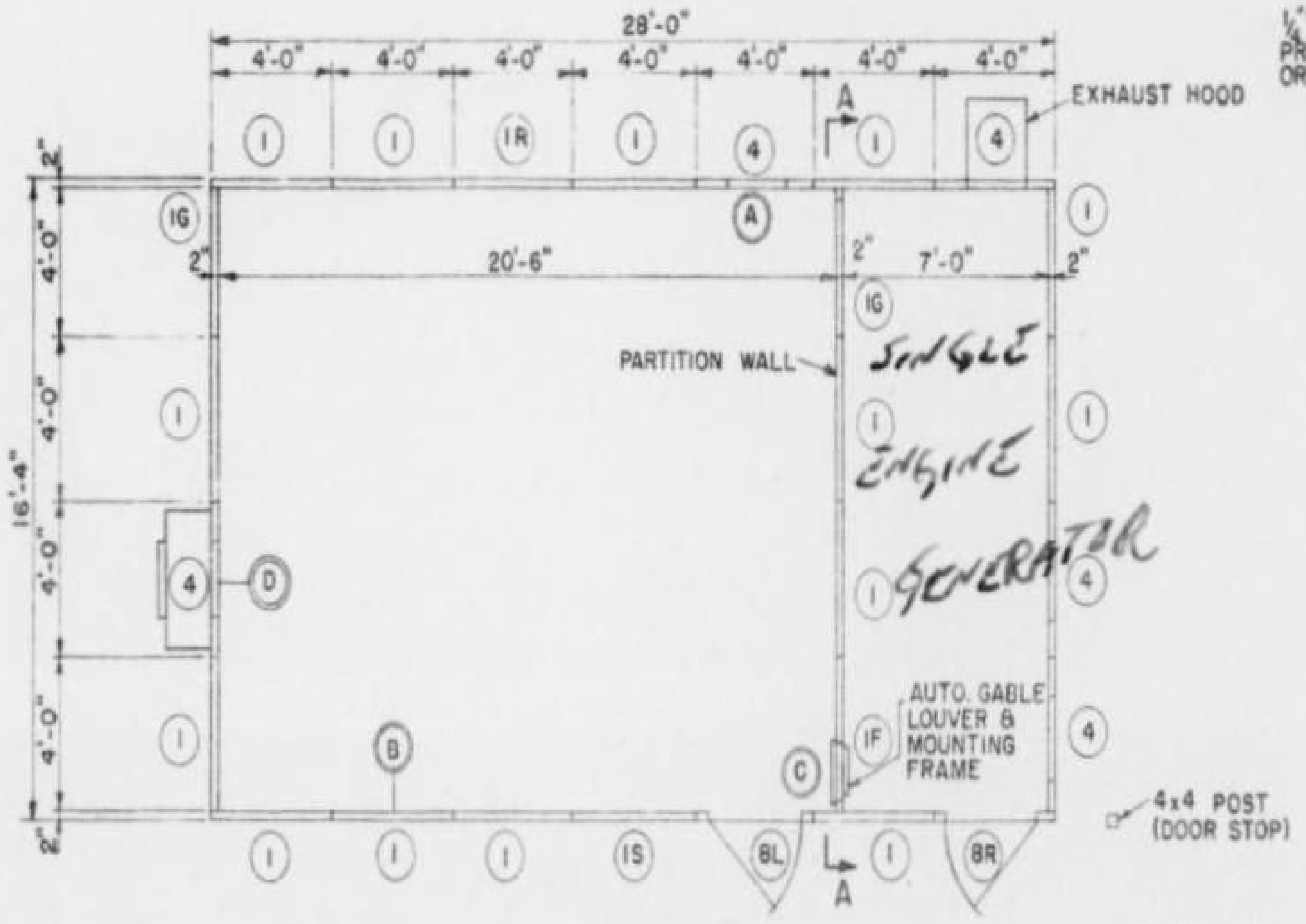
APPROVED: W. J. Alpin
CHIEF, STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
CHECKED:
DESIGNED: KL
DRAWN: G.K.W.
TRACED: E.H.S.
DATE: 1-14-47
DR. D-2798-5

SUPERSEDES DWGS. D-2798-3 & D-2798-4

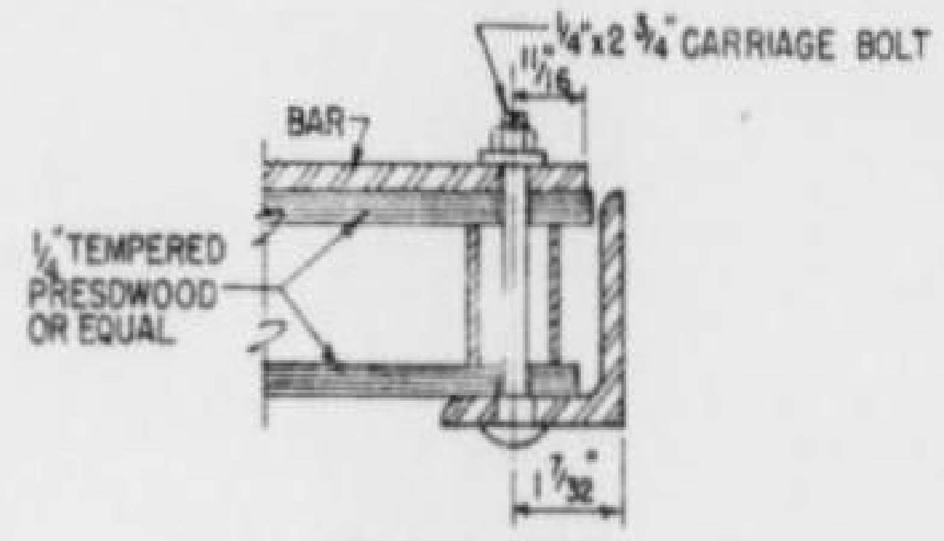
Ordered 2 Copies



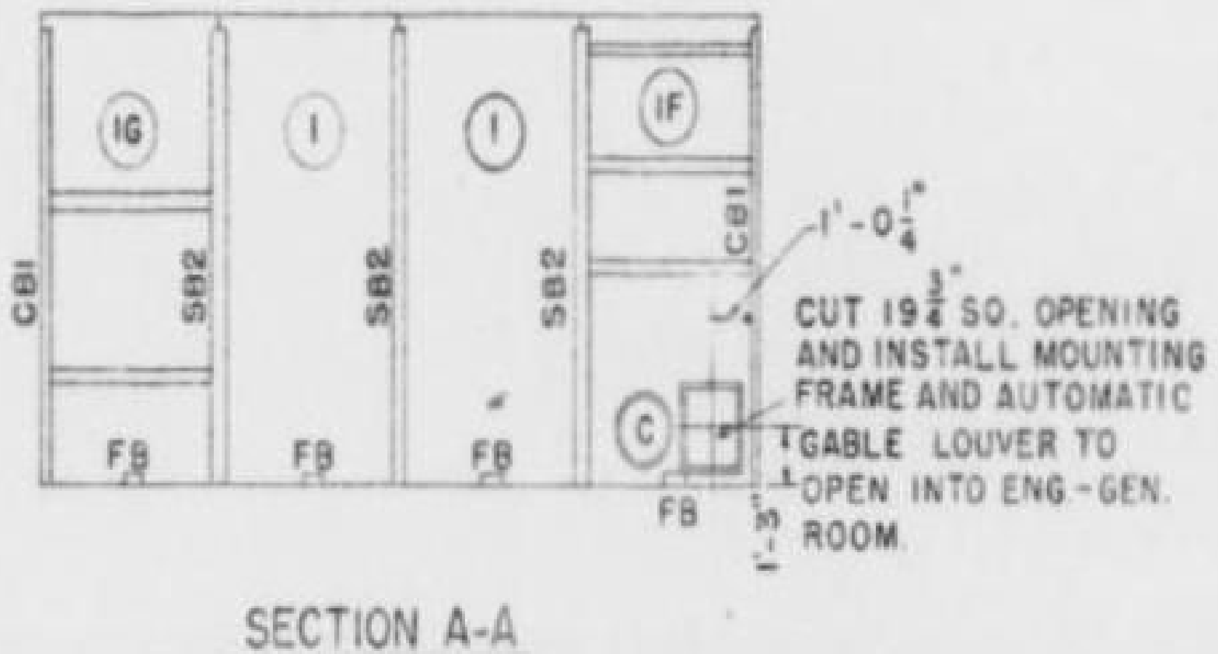
INTERIOR WALLS SHOWING BATTENS



PLAN

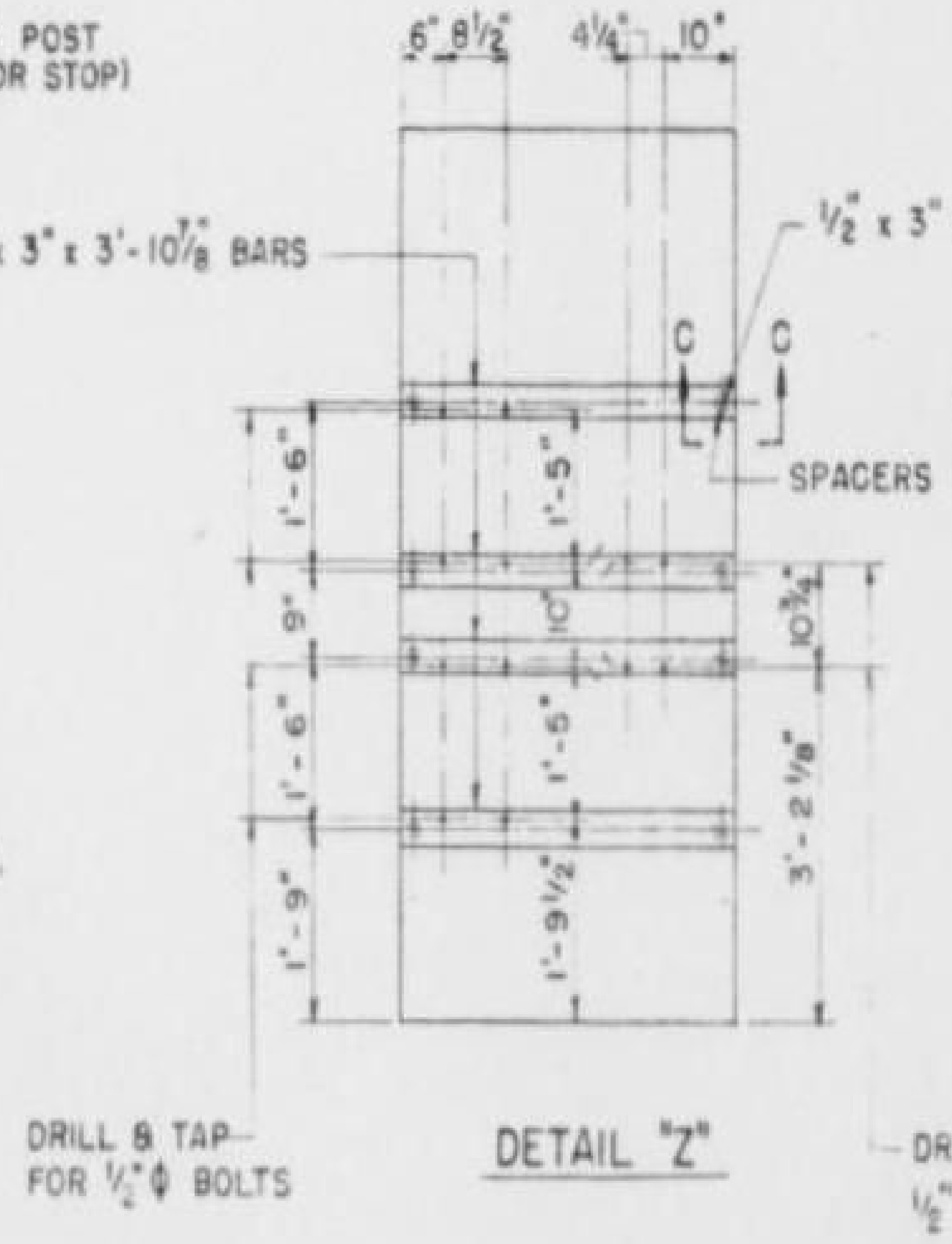


SECTION B-B

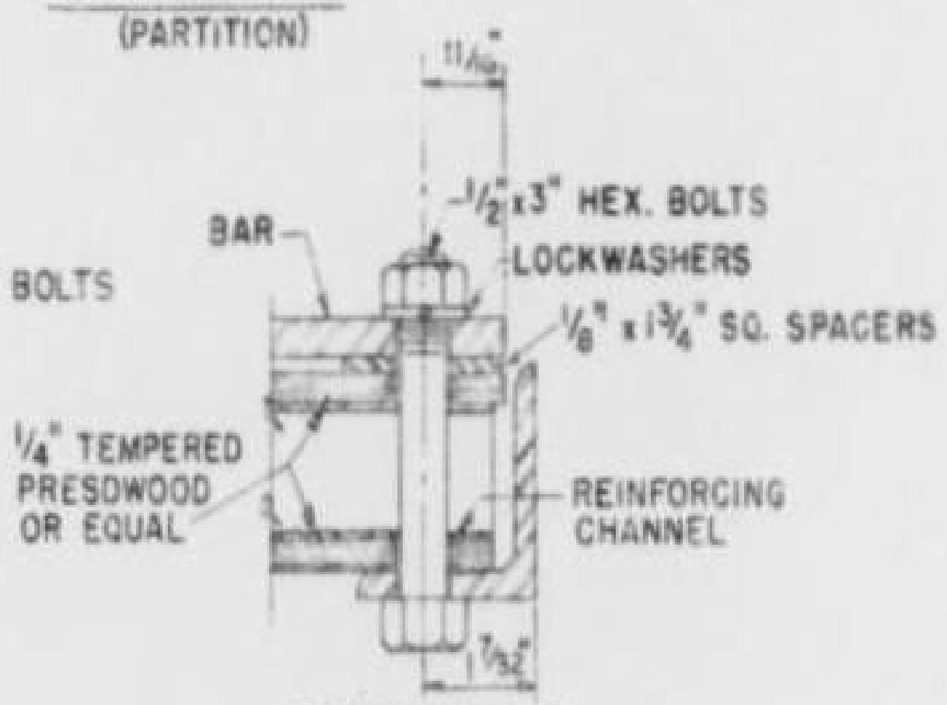

CBI
SB2
FB
1'-0 1/4"
CUT 19 3/4" SQ. OPENING AND INSTALL MOUNTING FRAME AND AUTOMATIC GABLE LOUVER TO OPEN INTO ENG-GEN. ROOM
1'-3"

SECTION A-A
(PARTITION)

No.	ORDER OF ERECTION
1	FOUNDATION
2.	CORNER PANELS
3	SIDE AND END PANELS
4.	PARTITION
5.	INSIDE BATTENS



DETAIL "Z"



SECTION C-C

VENTIALTION NOTES

1. NEW BUILDING:
   INSTALL 3200 CFM TYPE "TT" AIR FILTER WITH 3200 CFM FAN IN ALL NEW BUILDINGS AT OPENING Ⓓ. COVER OPENING Ⓐ WITH 1/4" MASONITE. (CAULK). NEW BUILDINGS HAVE NO OPENING AT Ⓑ.
2. EXISTING BUILDINGS:
   (A) NO MODIFICATIONS REQUIRED AT OPENINGS Ⓐ AND Ⓑ WHERE EQUIPPED WITH FAN TYPE AIR FILTERS. EXISTING BUILDINGS HAVE NO OPENING AT Ⓓ. CUT OPENING AT Ⓒ AND INSTALL AUTOMATIC GABLE LOUVER TO OPEN INTO ENGINE-GENERATOR ROOM. PROVIDE SPACERS BETWEEN MASONITE SHEETS AS NEEDED.

   (B) WHERE OPENINGS Ⓐ AND Ⓑ ARE EQUIPPED WITH TYPE- "T" AIR FILTERS (NO FAN) REMOVE LOUVERS, AIR FILTERS AND CHANGE WALL PANELS AT POSITIONS Ⓑ AND Ⓓ SO OPENING IS AT Ⓓ. INSTALL 3200 CFM TYPE "TT" AIR FILTER AND 2450 CFM (GABLE FAN) OR 3200 CFM FAN AT Ⓓ.

   COVER OPENING Ⓐ WITH 1/4" MASONITE. (CAULK). CUT OPENING AT Ⓒ AND INSTALL AUTOMATIC GABLE LOUVER TO OPEN INTO ENGINE-GENERATOR ROOM. PROVIDE SPACERS BETWEEN MASONITE SHEETS AS NEEDED.

NOTES:

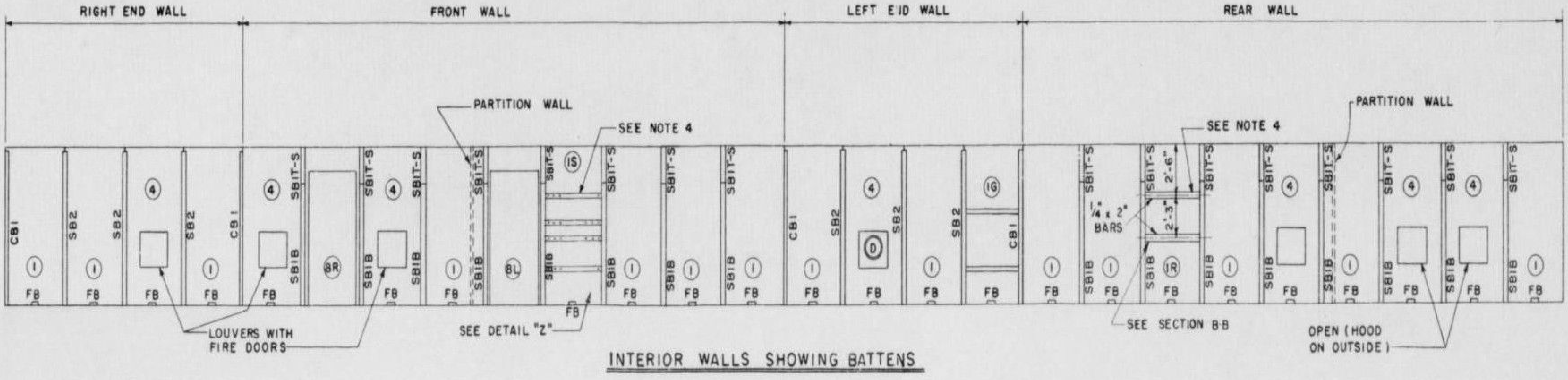
1. NUMBERS IN CIRCLES REFER TO PANEL TYPES
2. SEE DRAWINGS D-1702-10, D-1702-12B & 12C FOR ERECTION DETAILS
3. SEE DRAWING D-3338-13 FOR AIR FILTER INSTALLATION DETAILS
4. SEE DRAWING C-1701-23E FOR GABLE LOUVER MOUNTING FRAME
5. WHEN ADDING BARS TO NO. 1 WALL PANELS IN EXISTING BLDGS. CHANGE PANEL DESIGNATIONS AS SHOWN.

NO.	REVISION	DATE	CHECK
7	CHANGED BARS, SEE DETAIL "Z"	10-17-52	
6	MOVED BARS ON REAR WALL	3-13-52	
5	ADDED DRILL & TAP NOTE RAISED LOWER BAR ON DETAIL "Z"	8-6-51	
4	ADDED BARS IN DETAIL "Z"	3-26-51	
3	CORRECTED LENGTH OF BAR ON DETAIL "Z"	12-26-50	
2.	ADDED NOTE 4	8-1-50	
1.	CHANGED NOTES.	6-16-50	

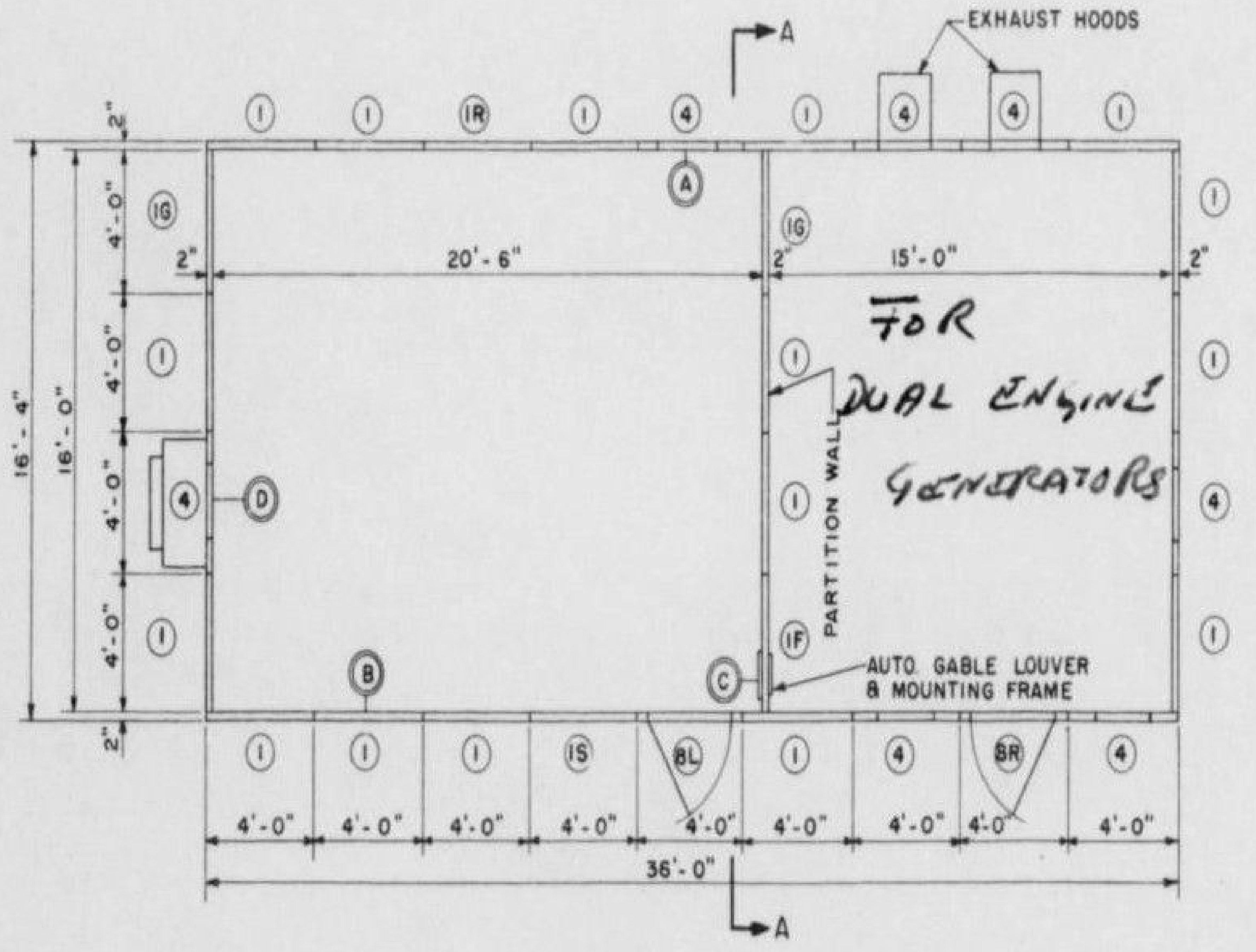
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
16'x28' TYPE "S" BLDG. WITH COUNTERPOISE ROOF
PANEL ERECTION

APPROVED: R. J. Alpher
R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: Mark H. Cooper
CHIEF OF SECTION
DESIGNED HRC
DRAWN DGC
TRACED DT
DATE 3-31-50
DR. D-1702-48

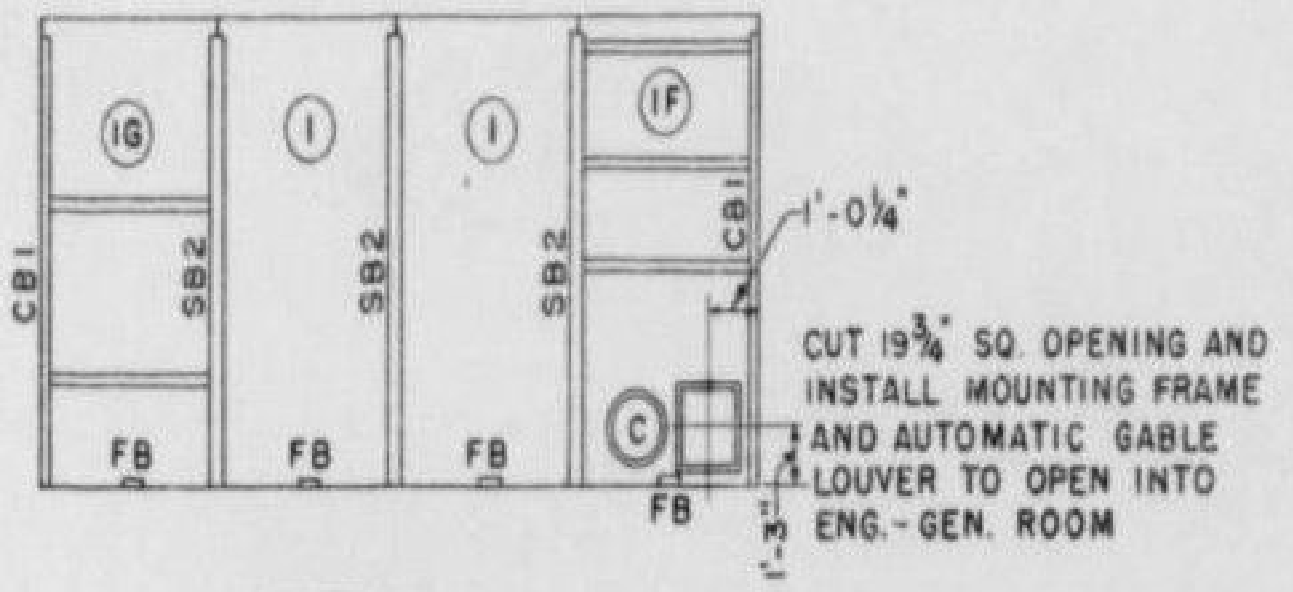


INTERIOR WALLS SHOWING BATTENS



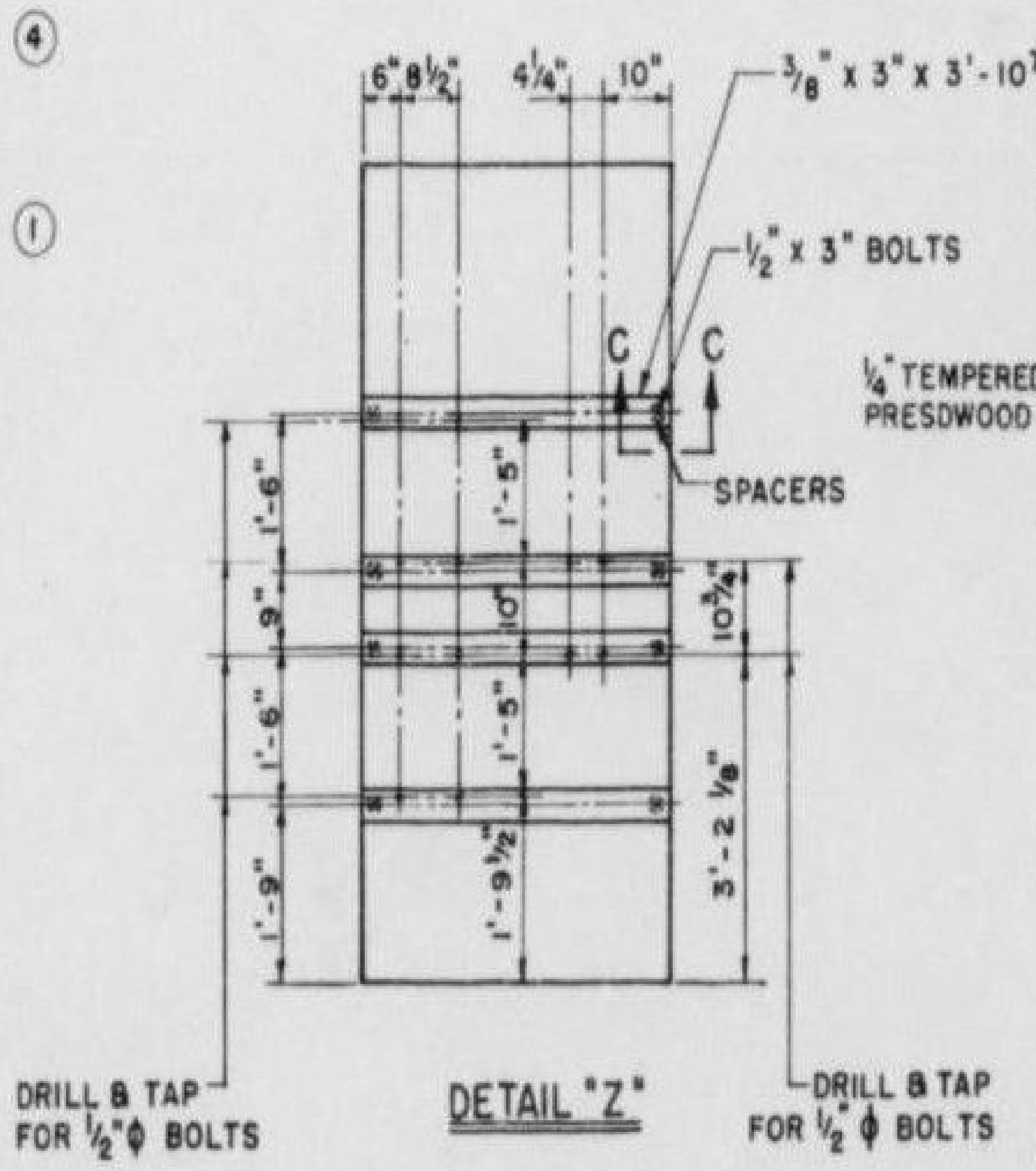
FOR DUAL ENGINE GENERATORS

PLAN

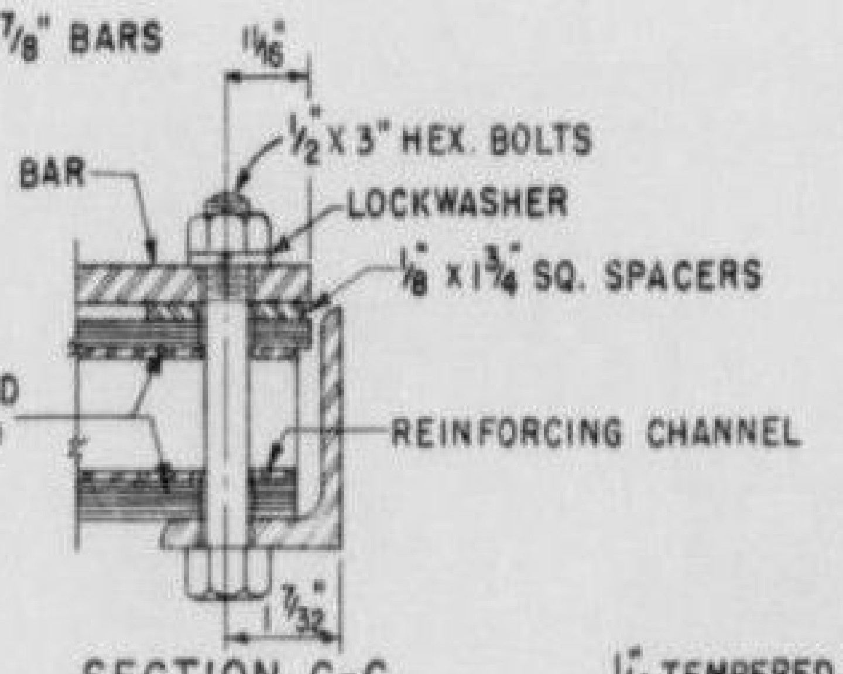

CB1
SB2
FB
1'-0 1/4"
1'-3"
CUT 19 3/4" SQ. OPENING AND INSTALL MOUNTING FRAME AND AUTOMATIC GABLE LOUVER TO OPEN INTO ENG.-GEN. ROOM

SECTION A-A
(PARTITION)

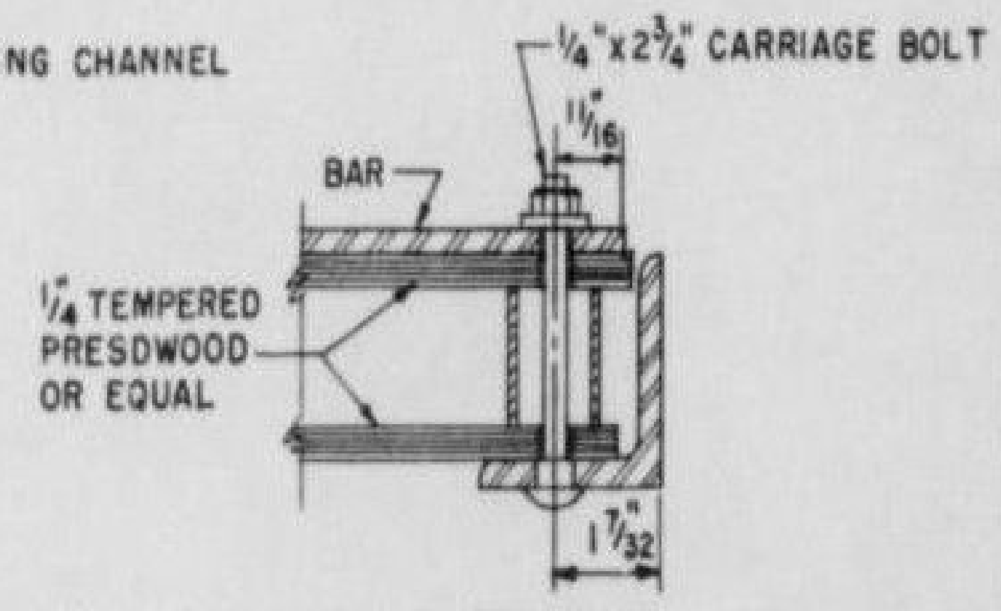
NO.	ORDER OF ERECTION
1	FOUNDATION
2	CORNER PANELS
3	SIDE AND END PANELS
4	PARTITION
5	INSIDE BATTENS



DETAIL "Z"



SECTION C-C



SECTION B-B

VENTILATION NOTES

1. NEW BUILDINGS:
   INSTALL 3200 CFM TYPE "TT" AIR FILTER WITH 3200 CFM FAN IN ALL NEW BUILDINGS AT OPENING Ⓓ COVER OPENING Ⓐ WITH 1/4" MASONITE, (CAULK). NEW BUILDINGS HAVE NO OPENING AT Ⓑ
2. EXISTING BUILDINGS:
   (A) NO MODIFICATIONS REQUIRED AT OPENINGS Ⓐ AND Ⓑ WHERE EQUIPPED WITH FAN TYPE AIR FILTERS. EXISTING BUILDINGS HAVE NO OPENING AT Ⓓ. CUT OPENING AT Ⓒ AND INSTALL AUTOMATIC GABLE LOUVER TO OPEN INTO ENGINE-GENERATOR ROOM. PROVIDE SPACERS BETWEEN MASONITE SHEETS AS NEEDED.

   (B) WHERE OPENINGS Ⓐ AND Ⓑ ARE EQUIPPED WITH TYPE "T" AIR FILTERS (NO FAN) REMOVE LOUVERS, AIR FILTERS AND CHANGE WALL PANELS AT POSITIONS Ⓑ AND Ⓓ SO OPENING IS AT Ⓓ. INSTALL 3200 CFM TYPE "TT" AIR FILTERS AND 2450 CFM (GABLE FAN) OR 3200 CFM FAN AT Ⓓ.

   COVER OPENING Ⓐ WITH 1/4" MASONITE, (CAULK). CUT OPENING AT Ⓒ AND INSTALL AUTOMATIC GABLE LOUVER TO OPEN INTO ENGINE-GENERATOR ROOM. PROVIDE SPACERS BETWEEN MASONITE SHEETS AS NEEDED

NOTES:

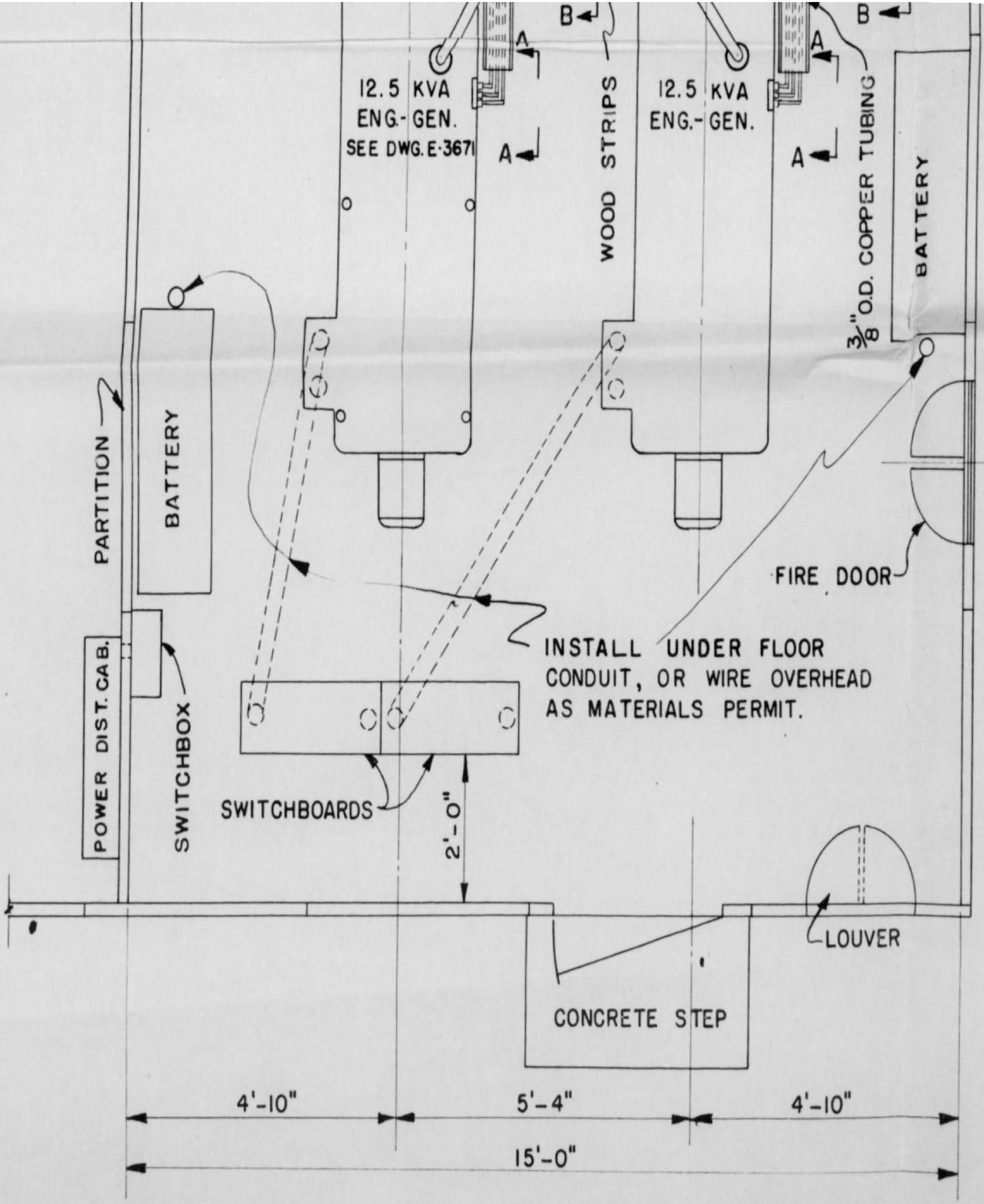
1. NUMBERS IN CIRCLES REFER TO PANEL TYPES.
2. SEE DRAWINGS D-1702-10, D-1702-12B & 12C FOR ERECTION DETAILS.
3. SEE DRAWING D-3338-13 FOR AIR FILTER INSTALLATION DETAILS.
4. WHEN ADDING BARS TO NO. 1 WALL PANELS IN EXISTING BUILDINGS CHANGE PANEL DESIGNATIONS AS SHOWN

NO.	REVISION	DATE	CHECKED
4	CHANGED BARS SEE DETAIL "Z"	10-17-52	HR
3	MOVED BARS ON REAR WALL	3-13-52	
2	ADDED HOLES AND RAISED LOWER BAR IN DETAIL "Z"	8-6-51	HL
1	ADDED BARS IN DETAIL "Z"	3-26-51	

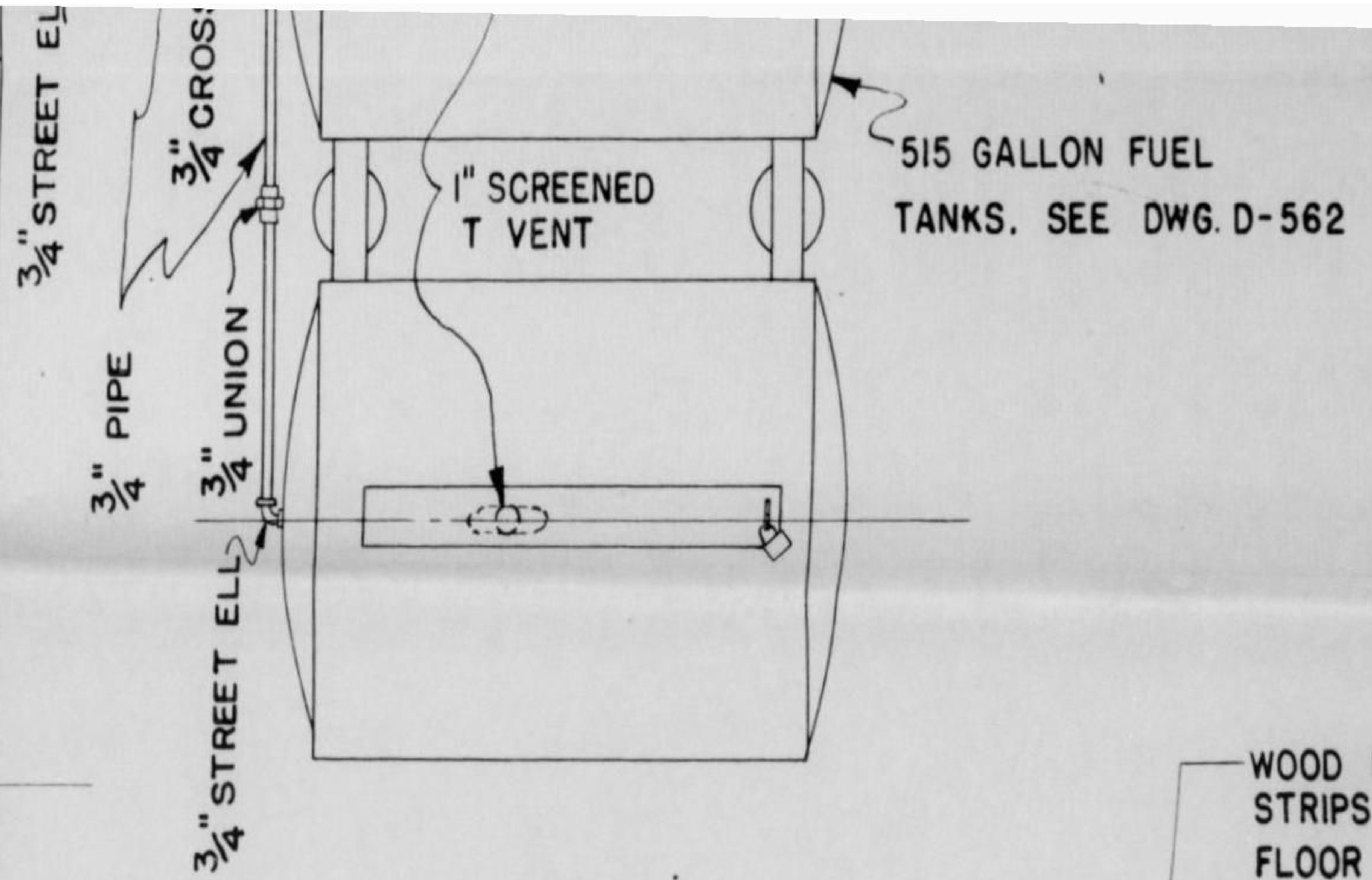
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

VHF OMNIRANGE
16'X36' TYPE "S" BLDG. WITH COUNTERPOISE ROOF
PANEL ERECTION

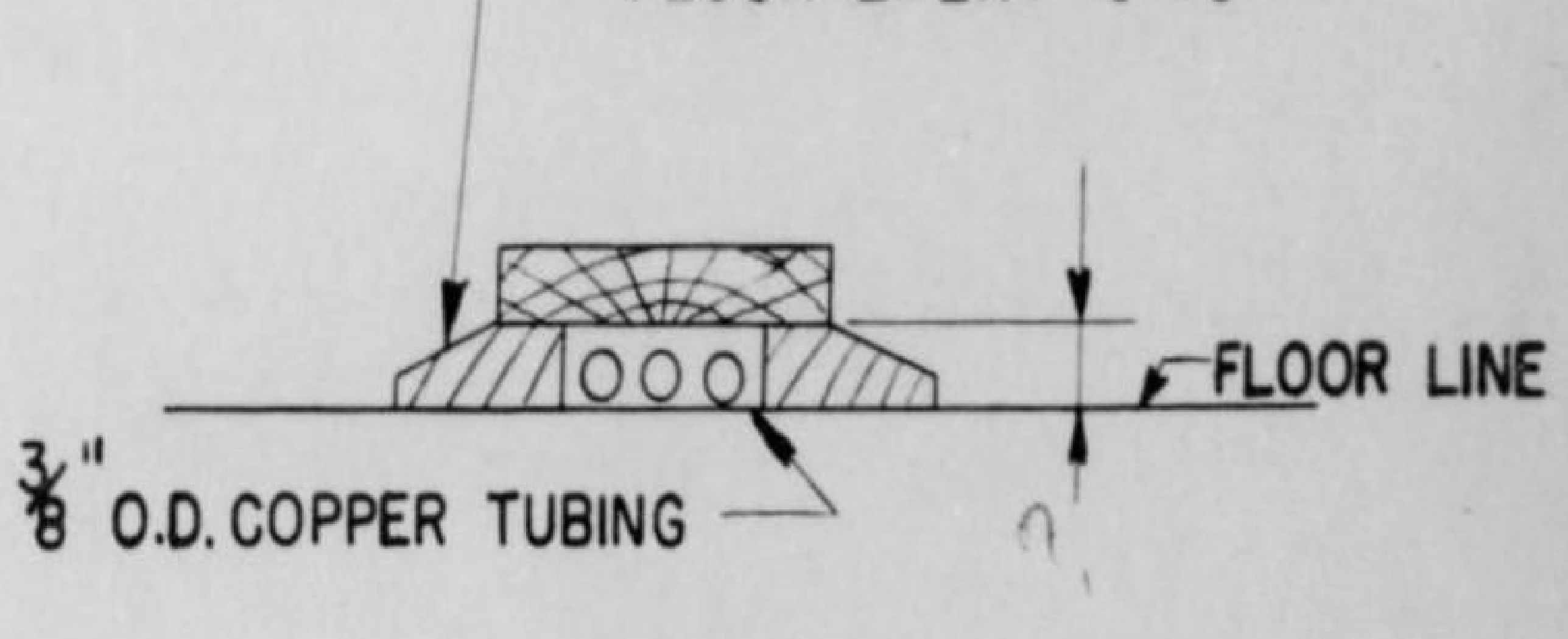
APPROVED: for R. J. ALPHER
CHIEF STRUC. & LIGHT. ESTAB. BRANCH
SUBMITTED BY: Frank H. Cosgrove
CHIEF OF SECTION
CHECKED: RB
DESIGNED:
DRAWN: H.M.
TRACED: J.F.F.
DATE: 8-15-50
DR. D-1702-51



PLAN



NOTE:
ALL 3/4" PIPE IS I.P.S.
ALL 3/4" PIPE & FITTINGS TO BE GALV. IRON.
ALL TUBING IS 3/8" O.D. COPPER TUBING.

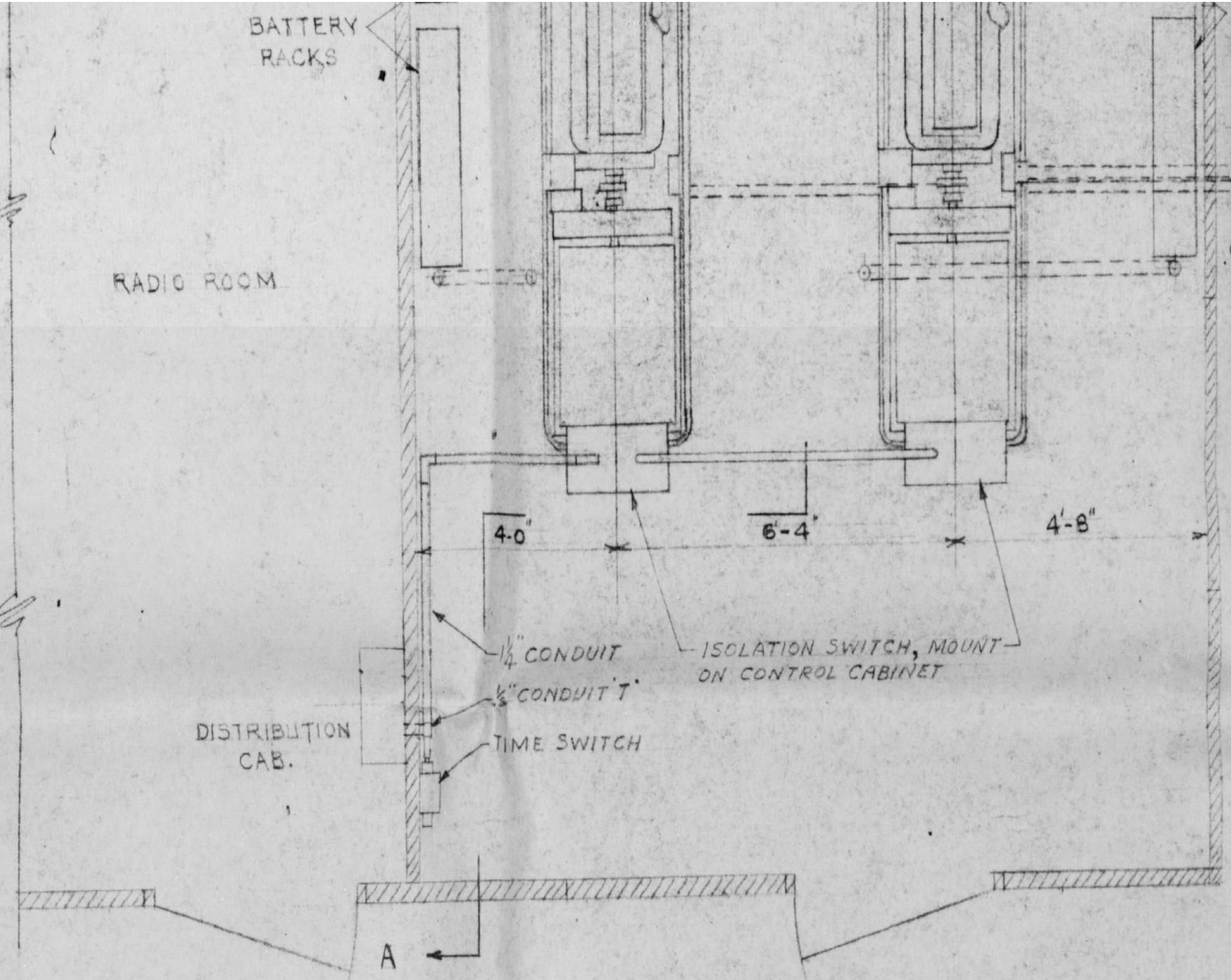


DETAIL B-B

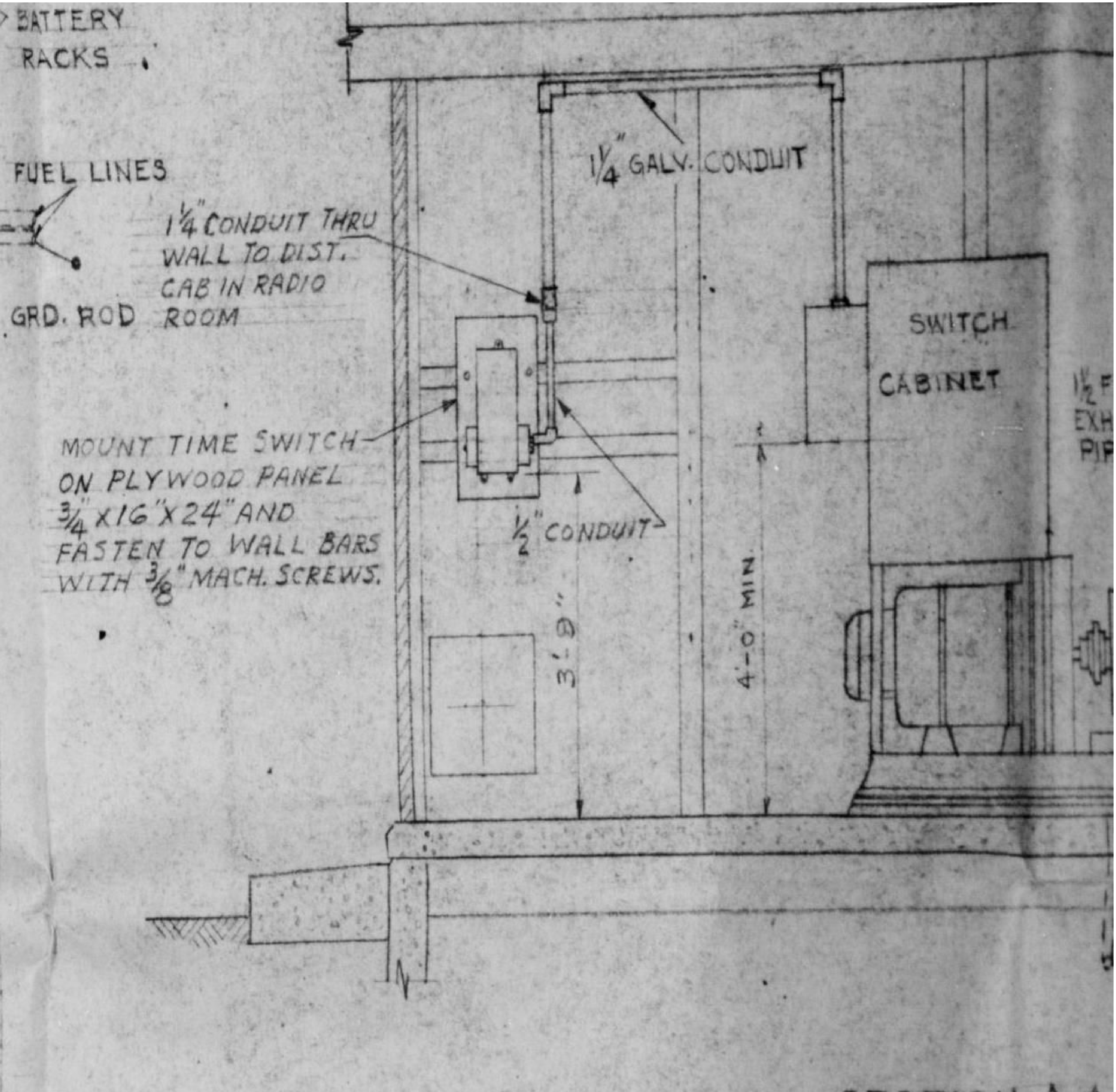
DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS SERVICE

TWO-12.5 KVA ENGINE-GENERATORS
IN SPECIAL TYPE "S" BLDG.
INSTALLATION DETAILS

APPROVED: C.M. LAMPLE
SUBMITTED BY:

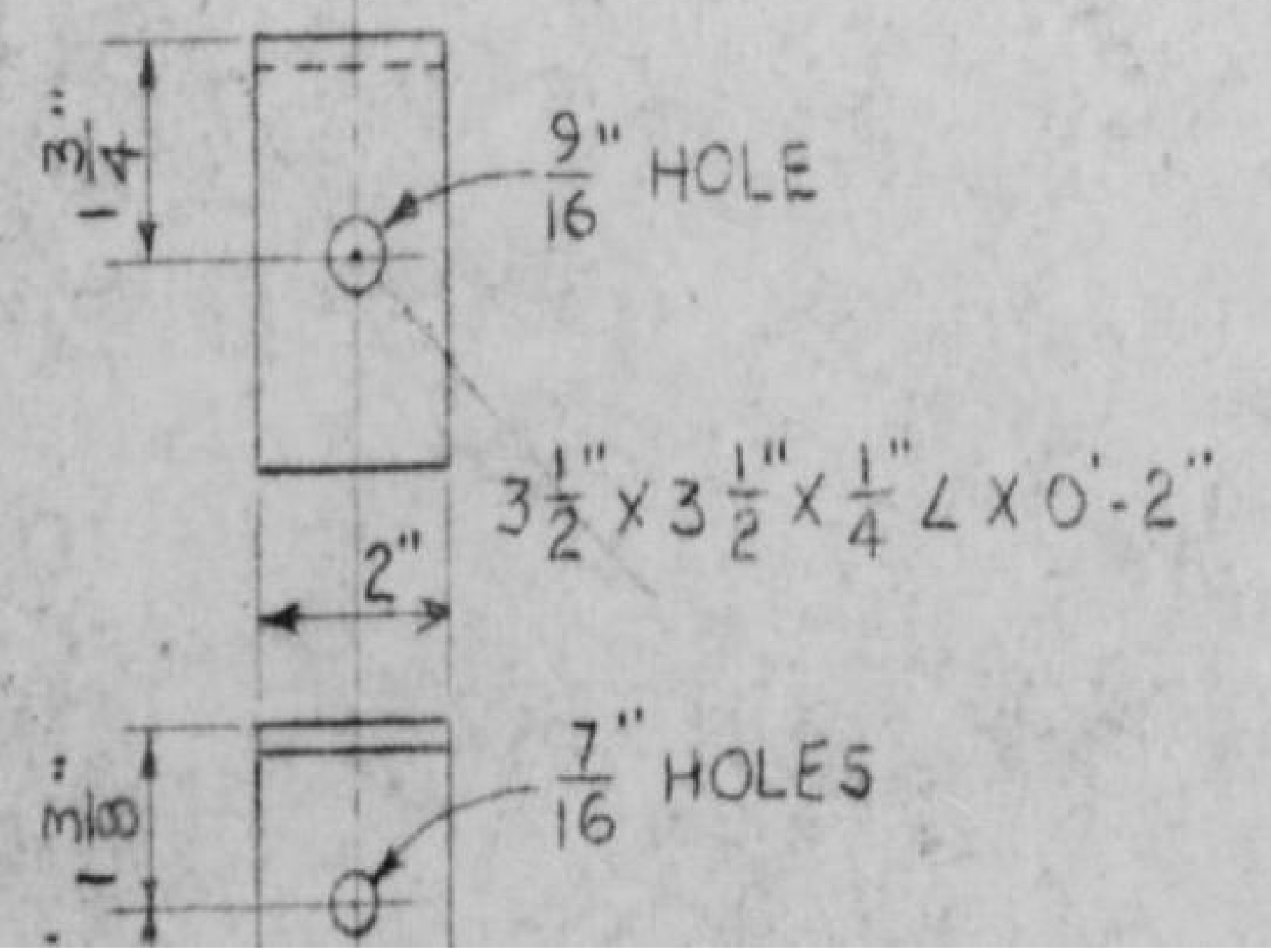


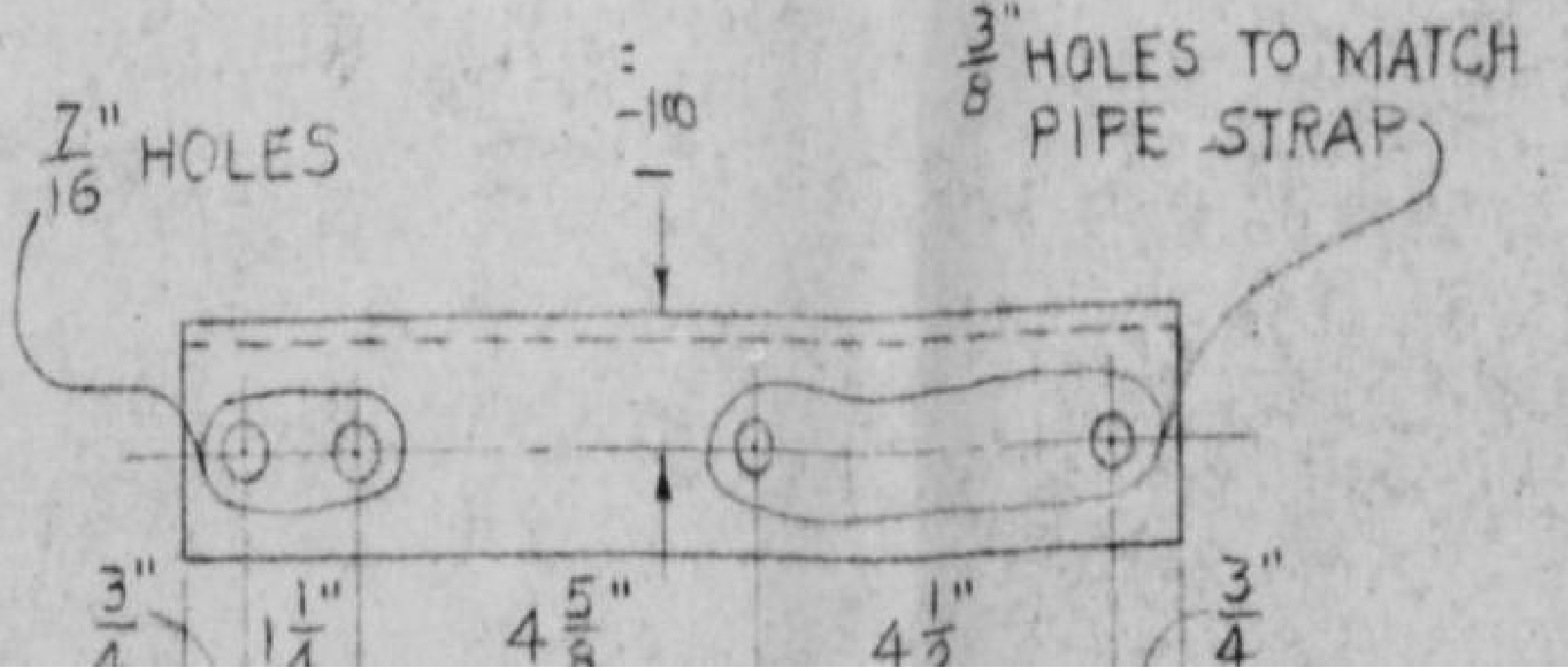
PLAN

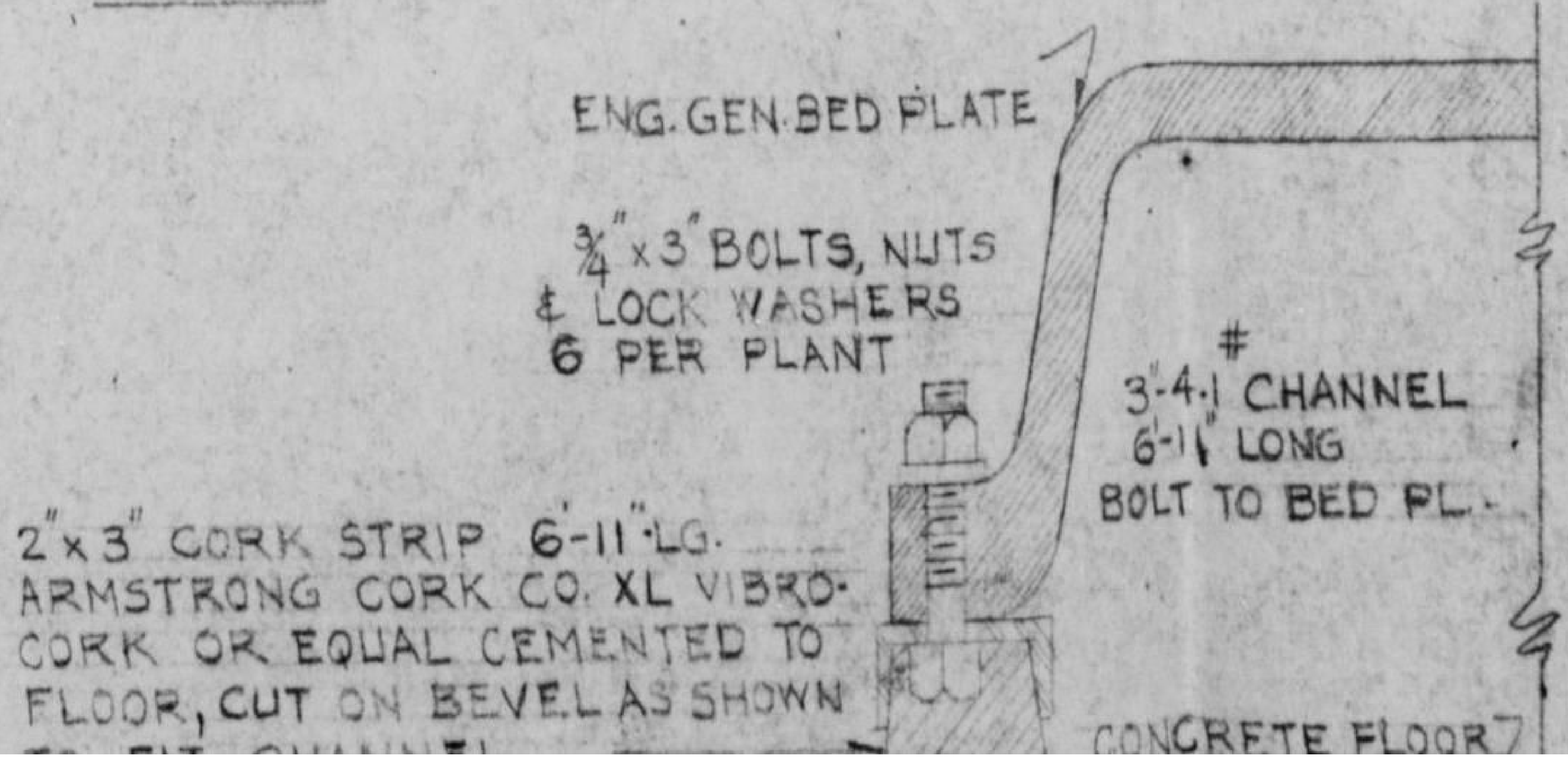

1¼" GALV. CONDUIT
1¼" CONDUIT THRU WALL TO DIST. CAB IN RADIO ROOM
SWITCH CABINET
1½" F EXH PIP
MOUNT TIME SWITCH ON PLYWOOD PANEL ¾"X16"X24" AND FASTEN TO WALL BARS WITH ⅜" MACH. SCREWS.
½" CONDUIT
3'-8"
4'-0" MIN.

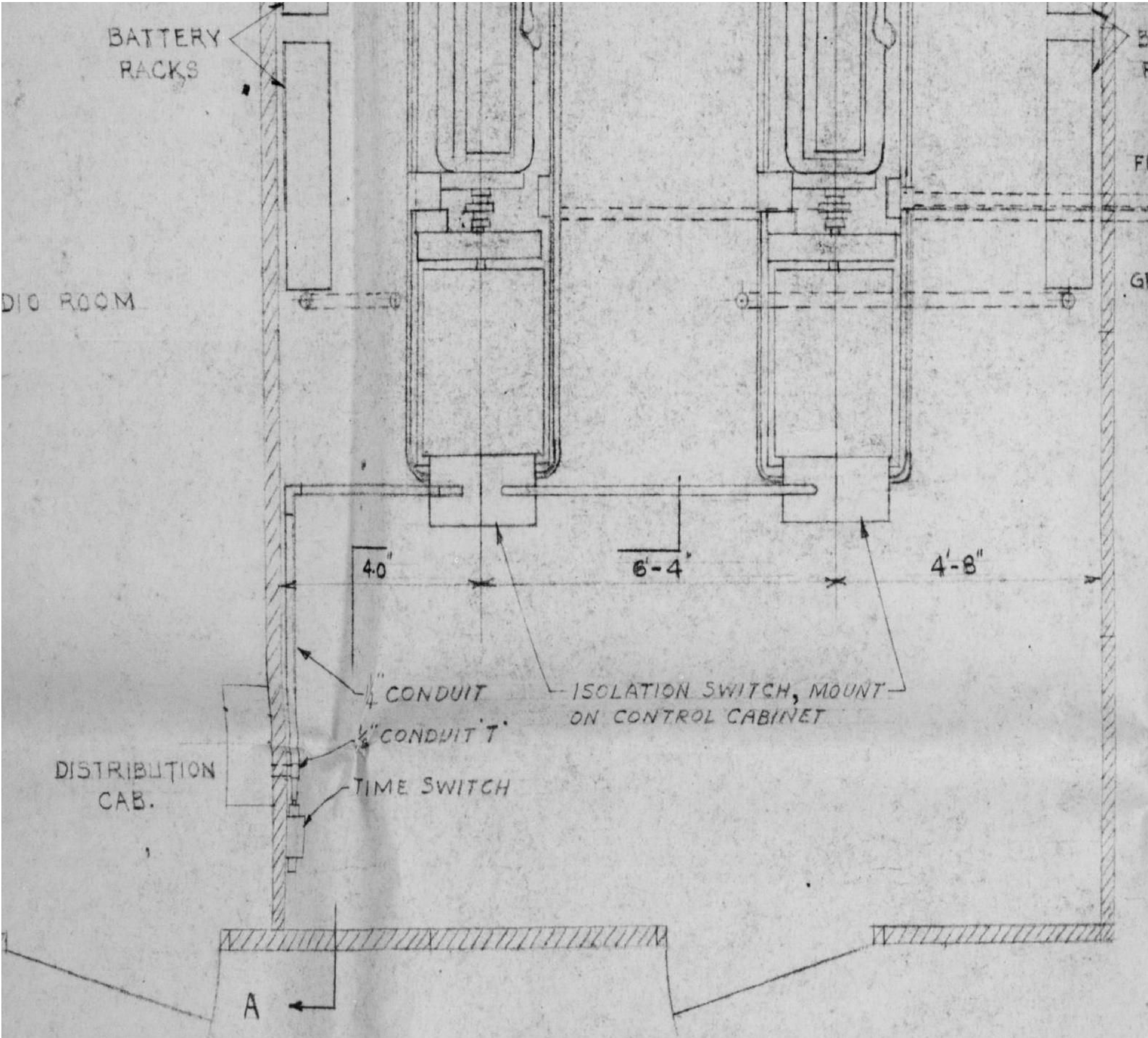
SECTION A-A

N

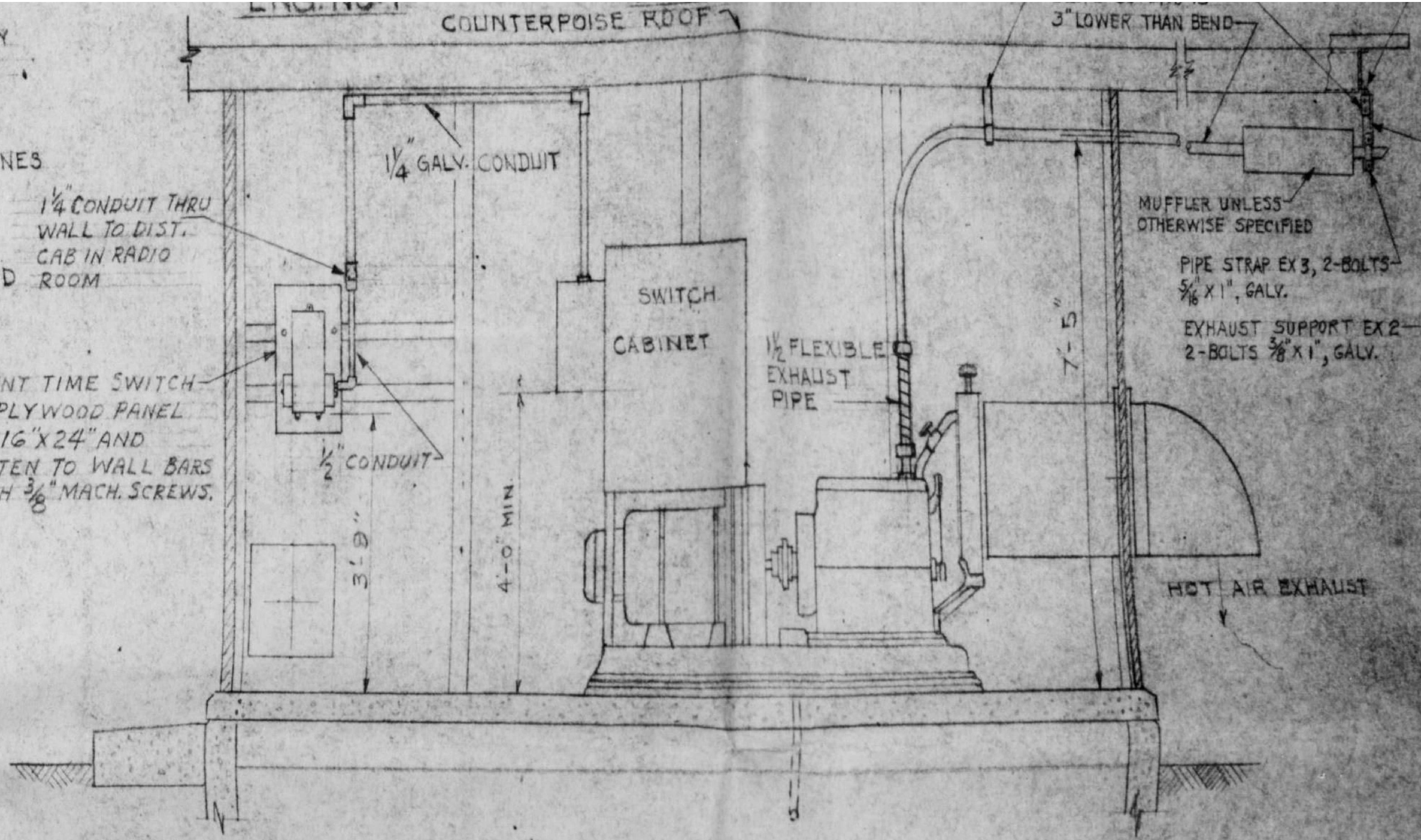





ENG. GEN. BED PLATE
¾" x 3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
3"-4.1# CHANNEL 6'-11" LONG BOLT TO BED PL.
2" x 3" CORK STRIP 6'-11" LG. ARMSTRONG CORK CO. XL VIBRO-CORK OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN TO FIT CHANNEL
CONCRETE FLOOR

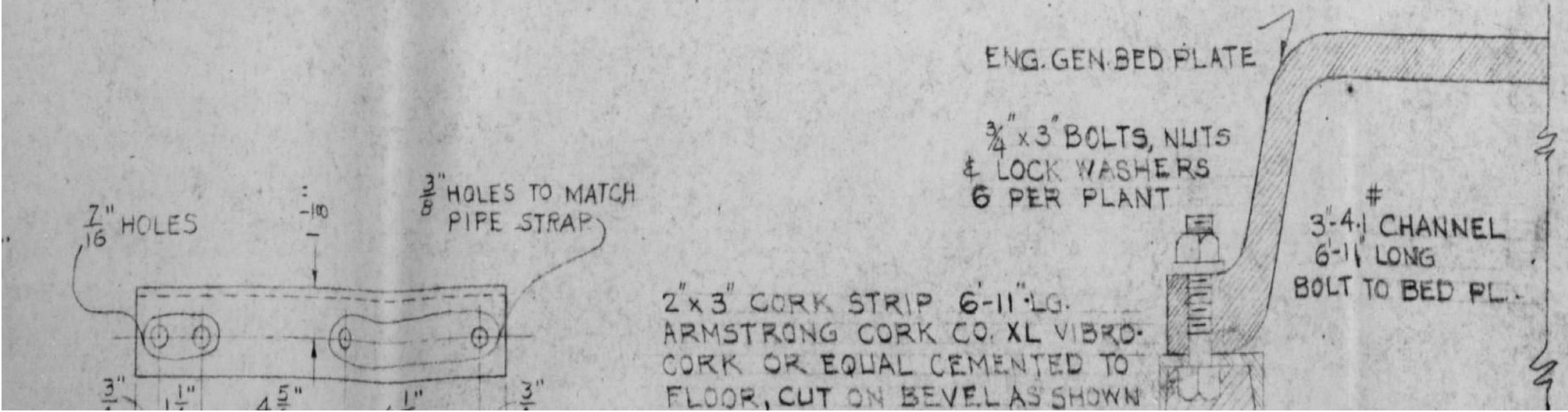


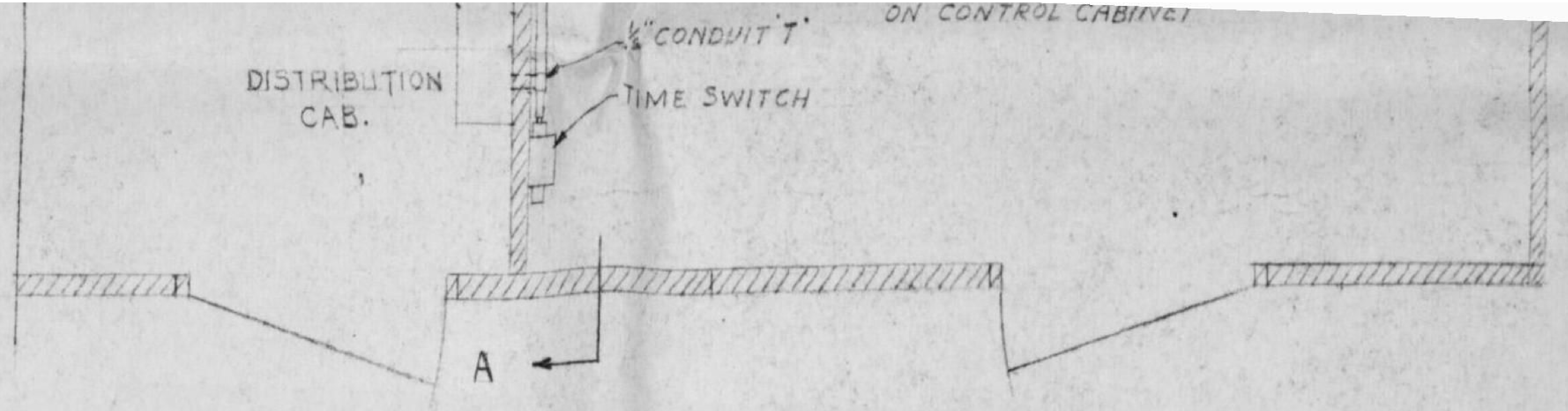
PLAN


COUNTERPOISE ROOF
3" LOWER THAN BEND
1¼" GALV. CONDUIT
1¼" CONDUIT THRU WALL TO DIST. CAB IN RADIO ROOM
MOUNT TIME SWITCH ON PLYWOOD PANEL ¾"X16"X24" AND FASTEN TO WALL BARS WITH 3/16" MACH. SCREWS.
½" CONDUIT
3'-9"
4'-0" MIN
SWITCH CABINET
1½" FLEXIBLE EXHAUST PIPE
7'-5"
MUFFLER UNLESS OTHERWISE SPECIFIED
PIPE STRAP EX 3, 2-BOLTS 5/16" X 1", GALV.
EXHAUST SUPPORT EX 2 2-BOLTS 3/8" X 1", GALV.
HOT AIR EXHAUST

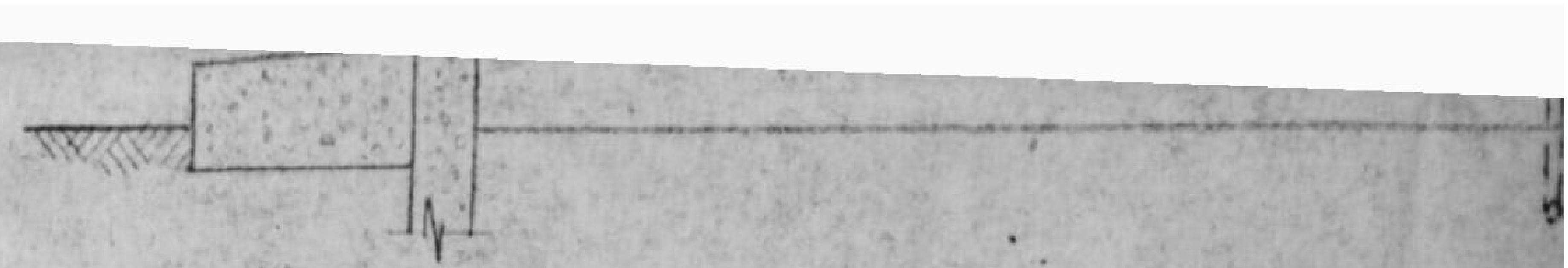
SECTION A-A

NOTES 1. FOR ELECTRICAL SEE DWG. 1702-51A
2. FOR WIRING OF INSTALLATION SEE DR. D-3317-24.

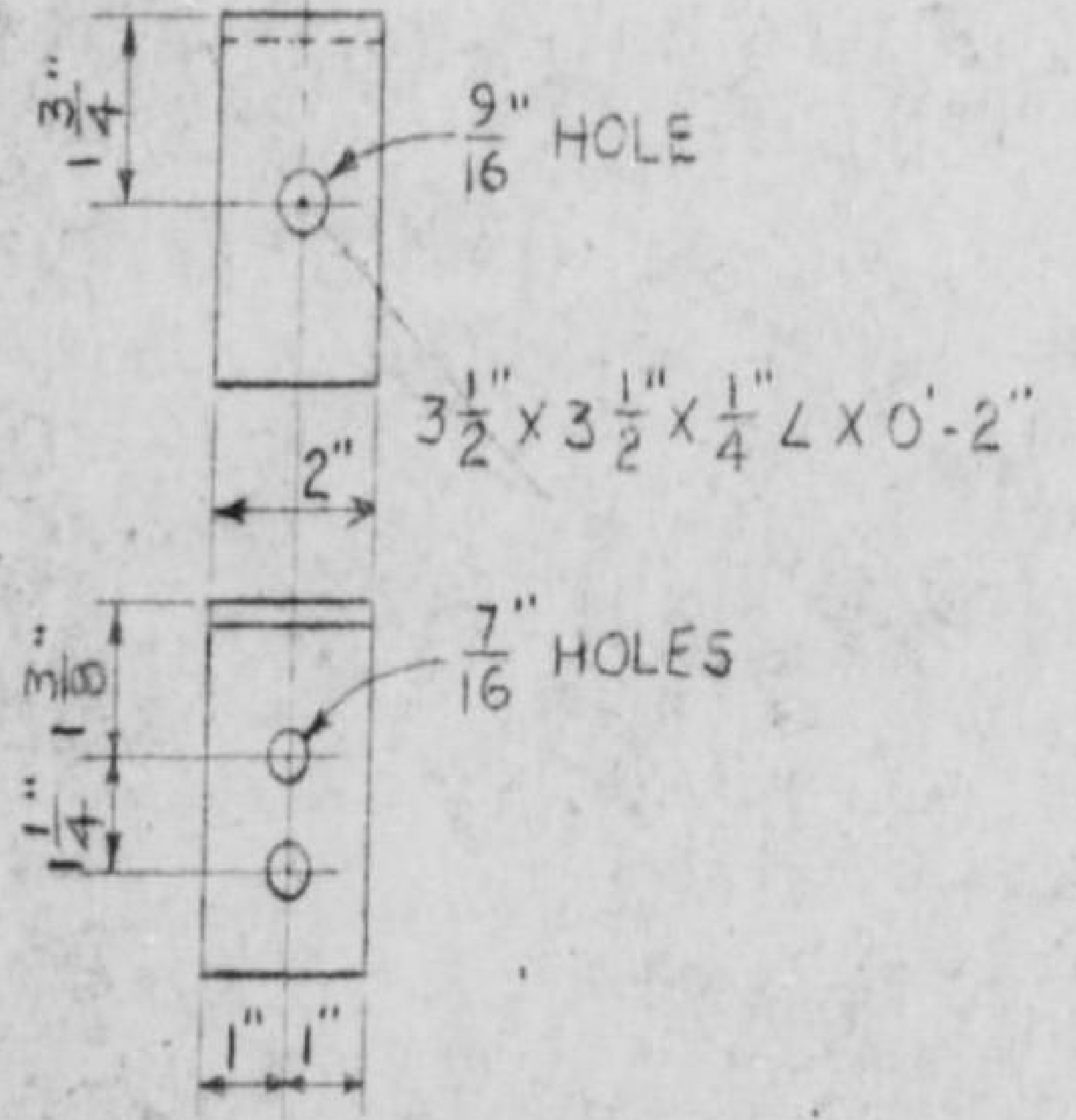

7/16" HOLES
3/8" HOLES TO MATCH PIPE STRAP
3"
1½"
4 5/8"
1"
3"
2"x3" CORK STRIP 6'-11" LG. ARMSTRONG CORK CO. XL VIBRO-CORK OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN
ENG. GEN. BED PLATE
¾"x3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
3"-4.1# CHANNEL 6'-1" LONG BOLT TO BED PL.



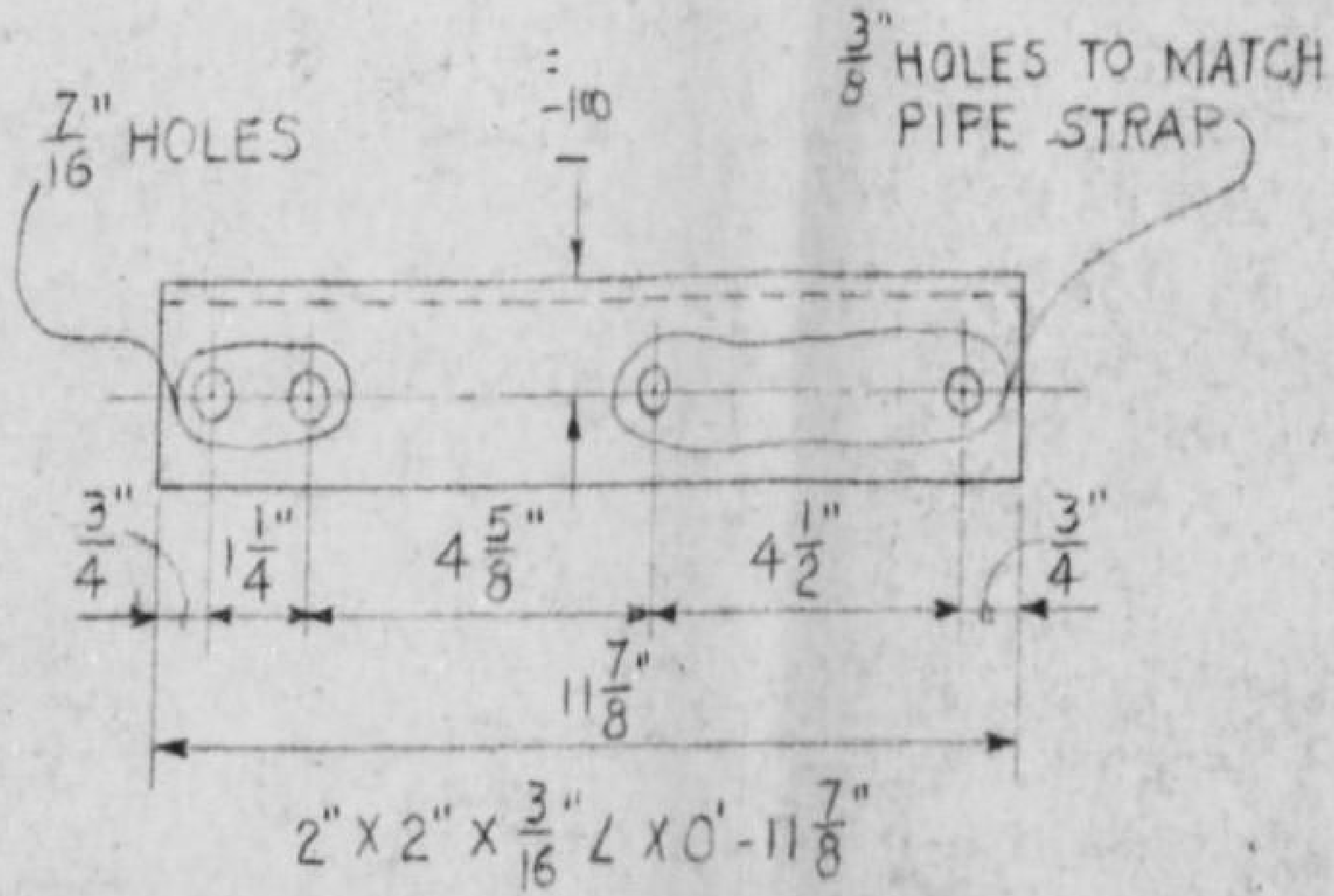
PLAN



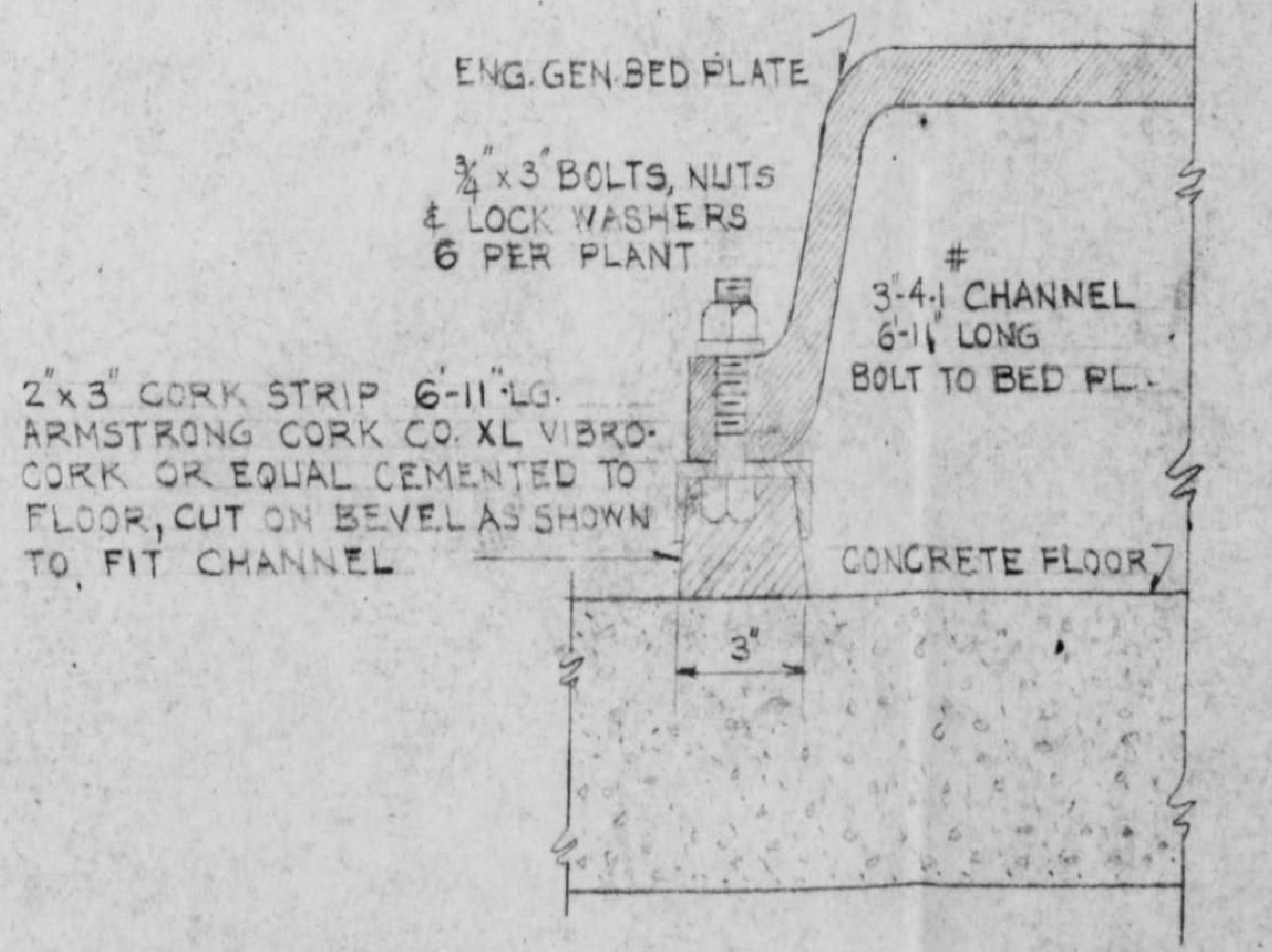
SECTION A-A



CLIP ANGLE MARK EX 1
2 REQ.

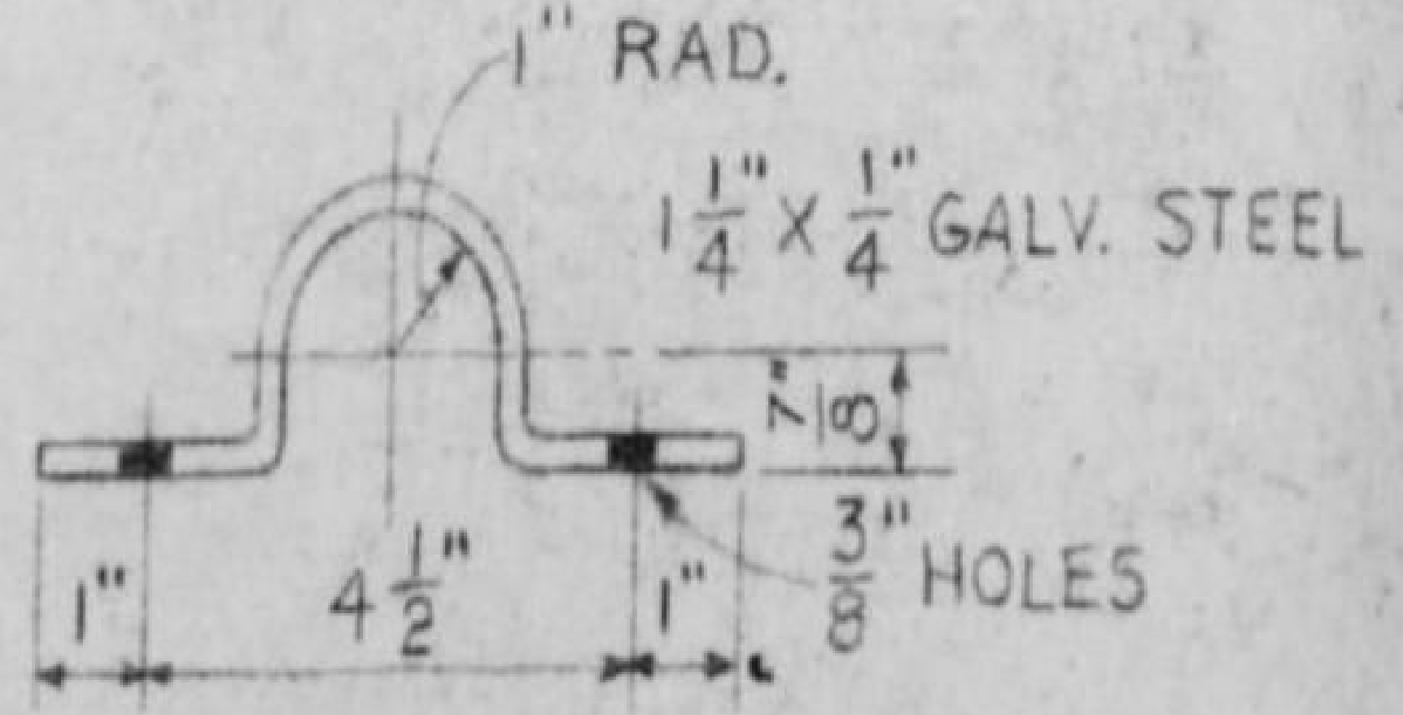


EXHAUST SUPPORT MARK EX 2
2 REQ.

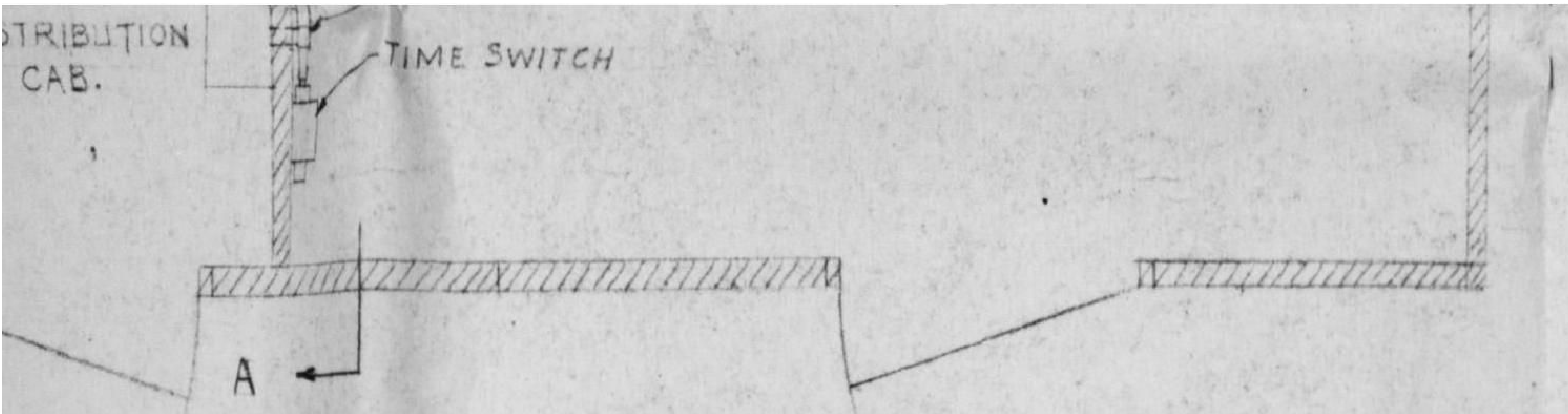


ENG. GEN. BED PLATE
¾" x 3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
3"-4.1# CHANNEL 6'-11" LONG BOLT TO BED PL.
2" x 3" CORK STRIP 6'-11" LG. ARMSTRONG CORK CO. XL VIBRO-CORK OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN TO FIT CHANNEL
CONCRETE FLOOR
3"

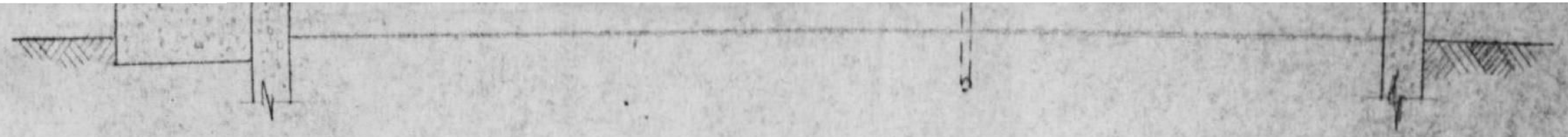
ENGINE MOUNTING DETAIL



PIPE STRAP MARK EX 3
2 REQ.

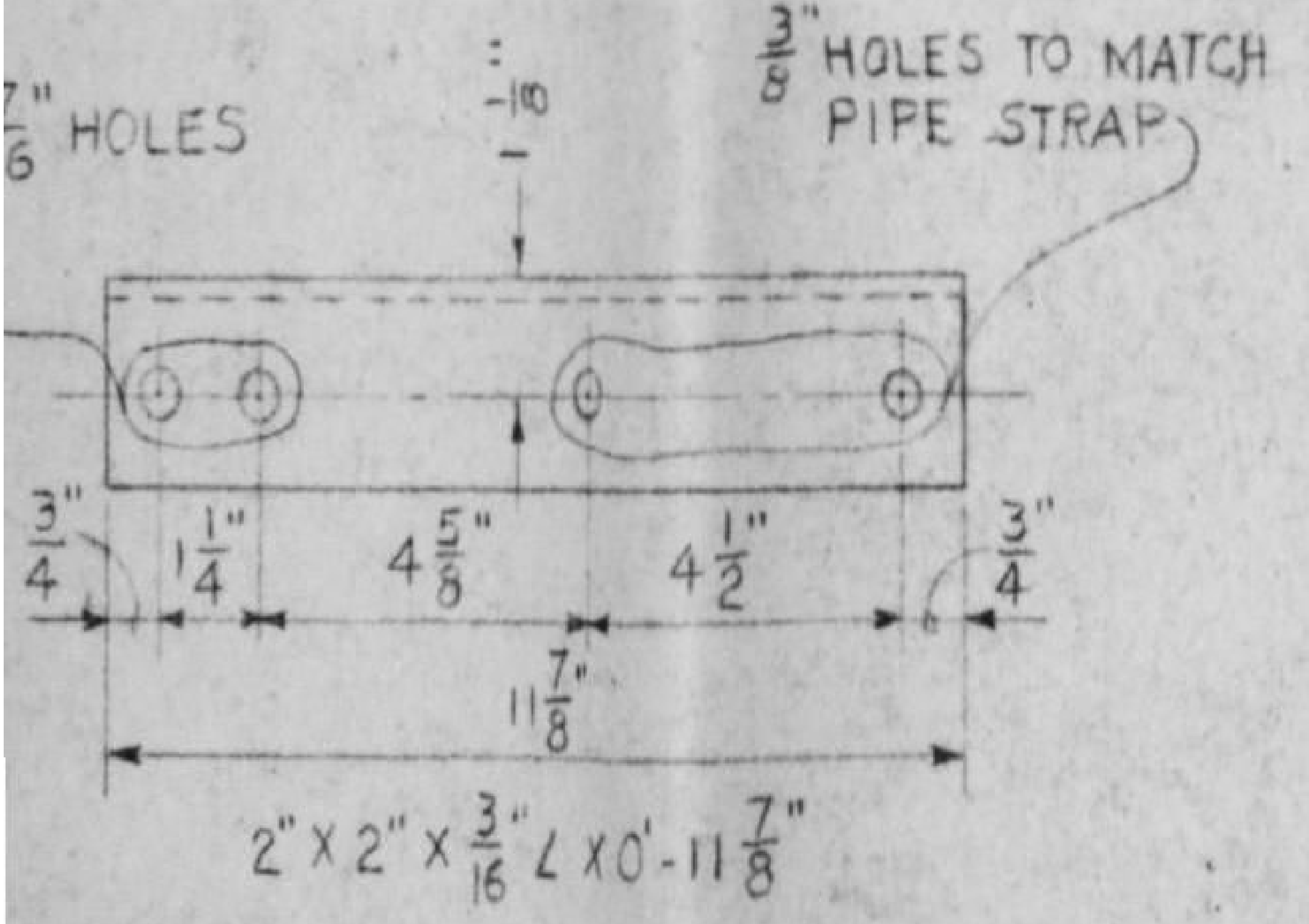


PLAN

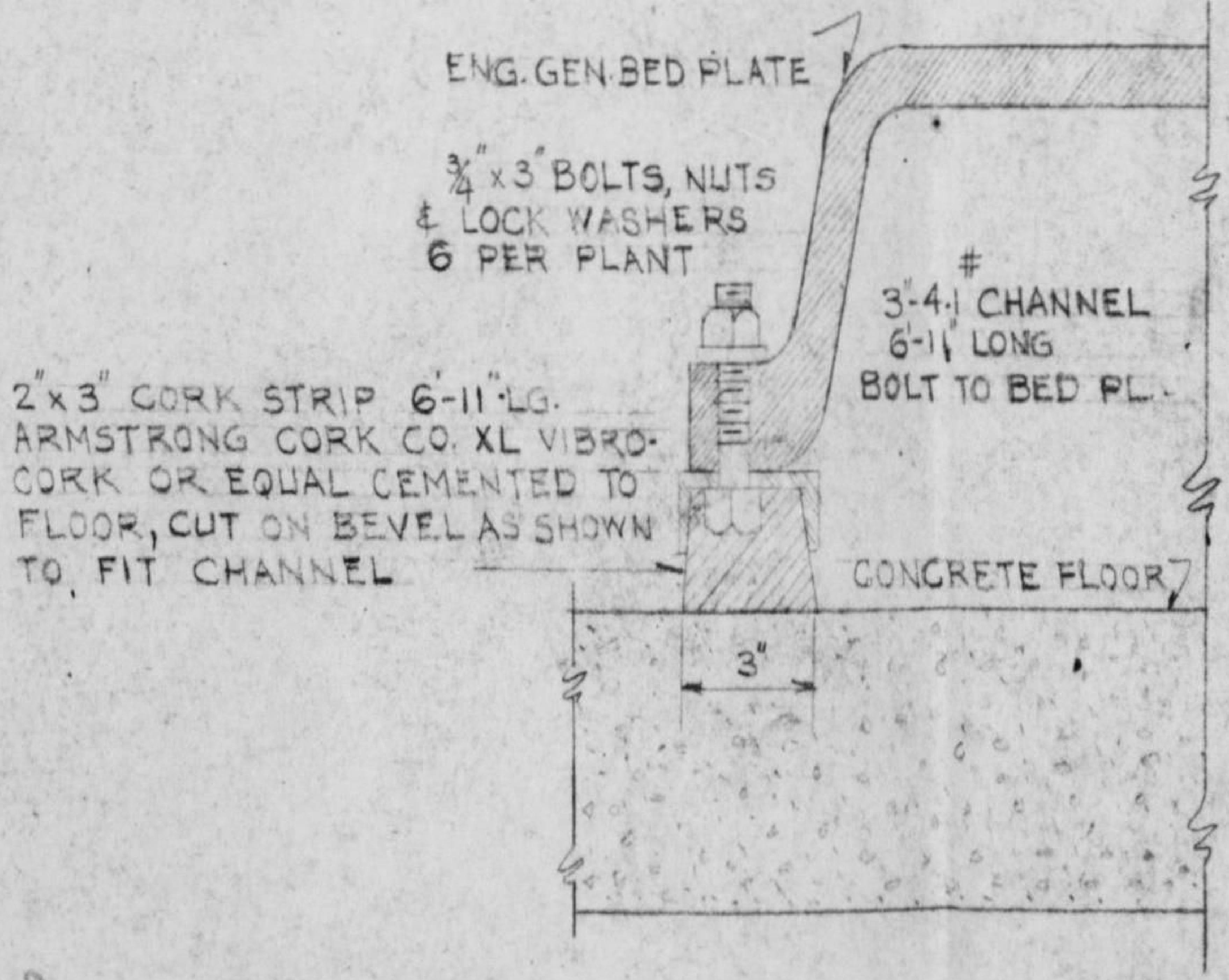


SECTION A-A

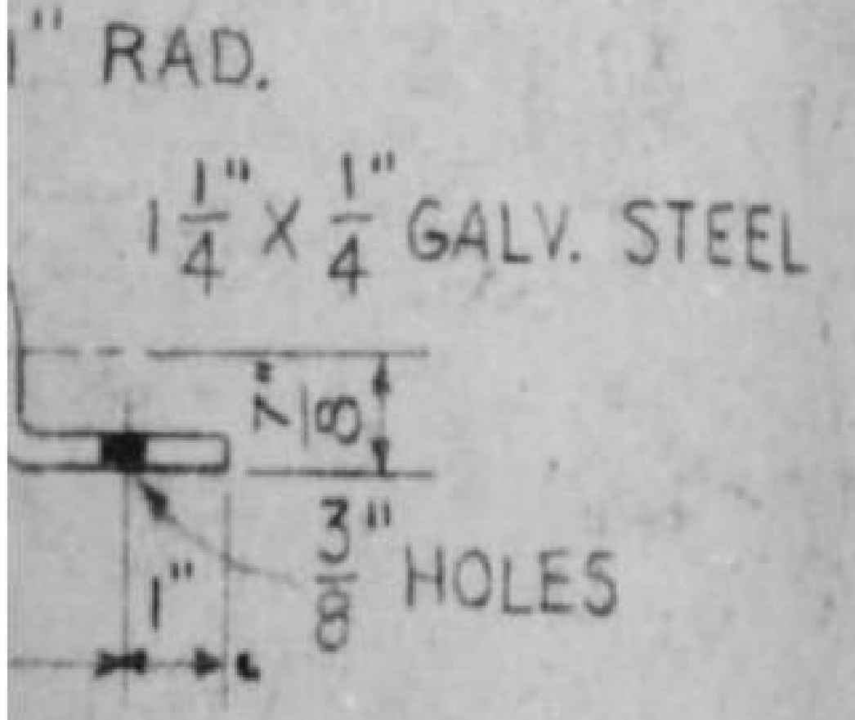
NOTES 1. FOR ELECTRICAL SEE DWG. 1702-51A
2. FOR WIRING OF INSTALLATION SEE DR. D-3317-24.



EXHAUST SUPPORT MARK EX 2
2 REQ.


ENG. GEN. BED PLATE
$\frac{3}{4}$" x 3" BOLTS, NUTS & LOCK WASHERS 6 PER PLANT
3"-4.1# CHANNEL 6'-11" LONG BOLT TO BED PL.
2" x 3" CORK STRIP 6'-11" LG. ARMSTRONG CORK CO. XL VIBRO-CORK OR EQUAL CEMENTED TO FLOOR, CUT ON BEVEL AS SHOWN TO FIT CHANNEL
CONCRETE FLOOR
3"

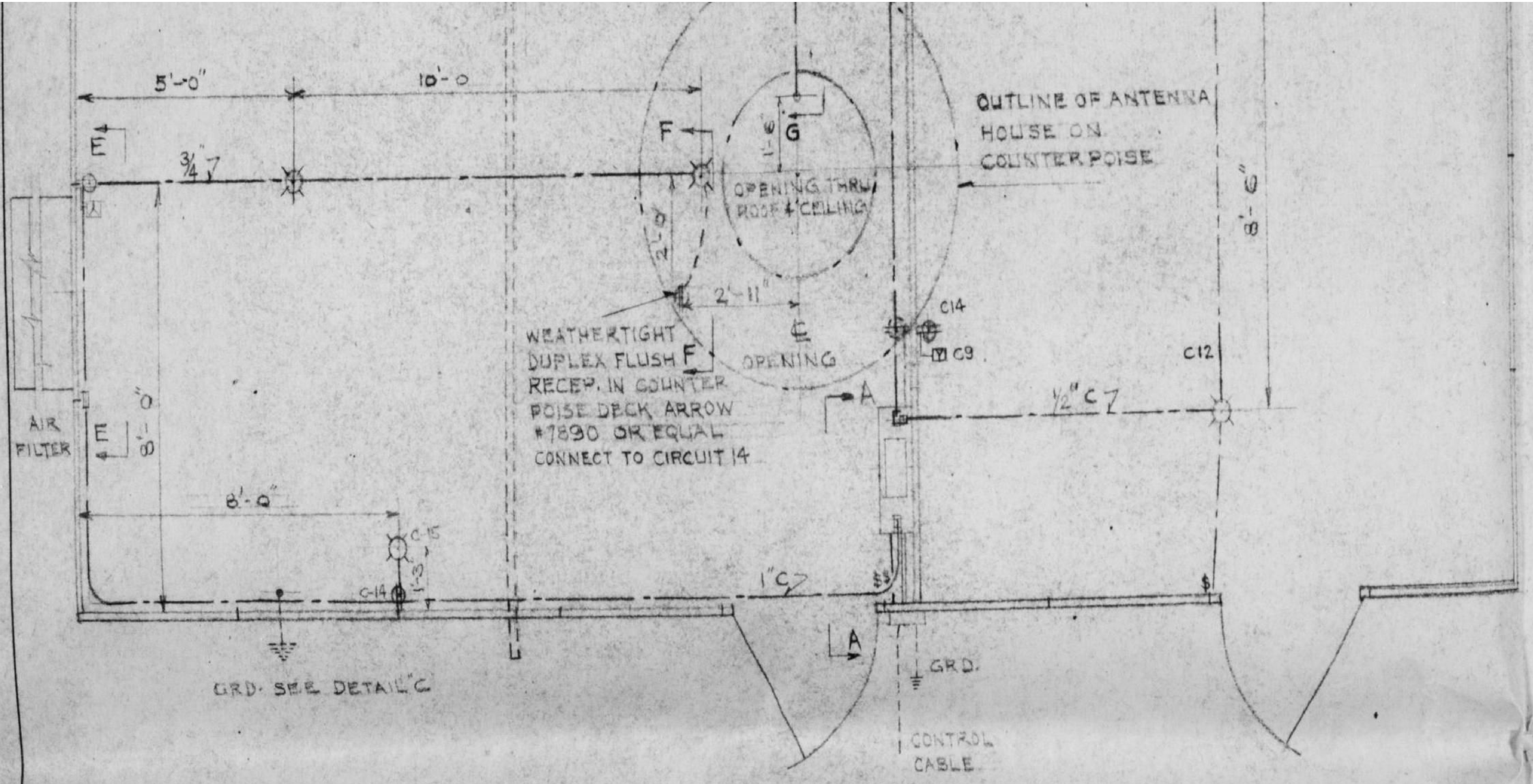
ENGINE MOUNTING DETAIL



MARK EX 3
Q.

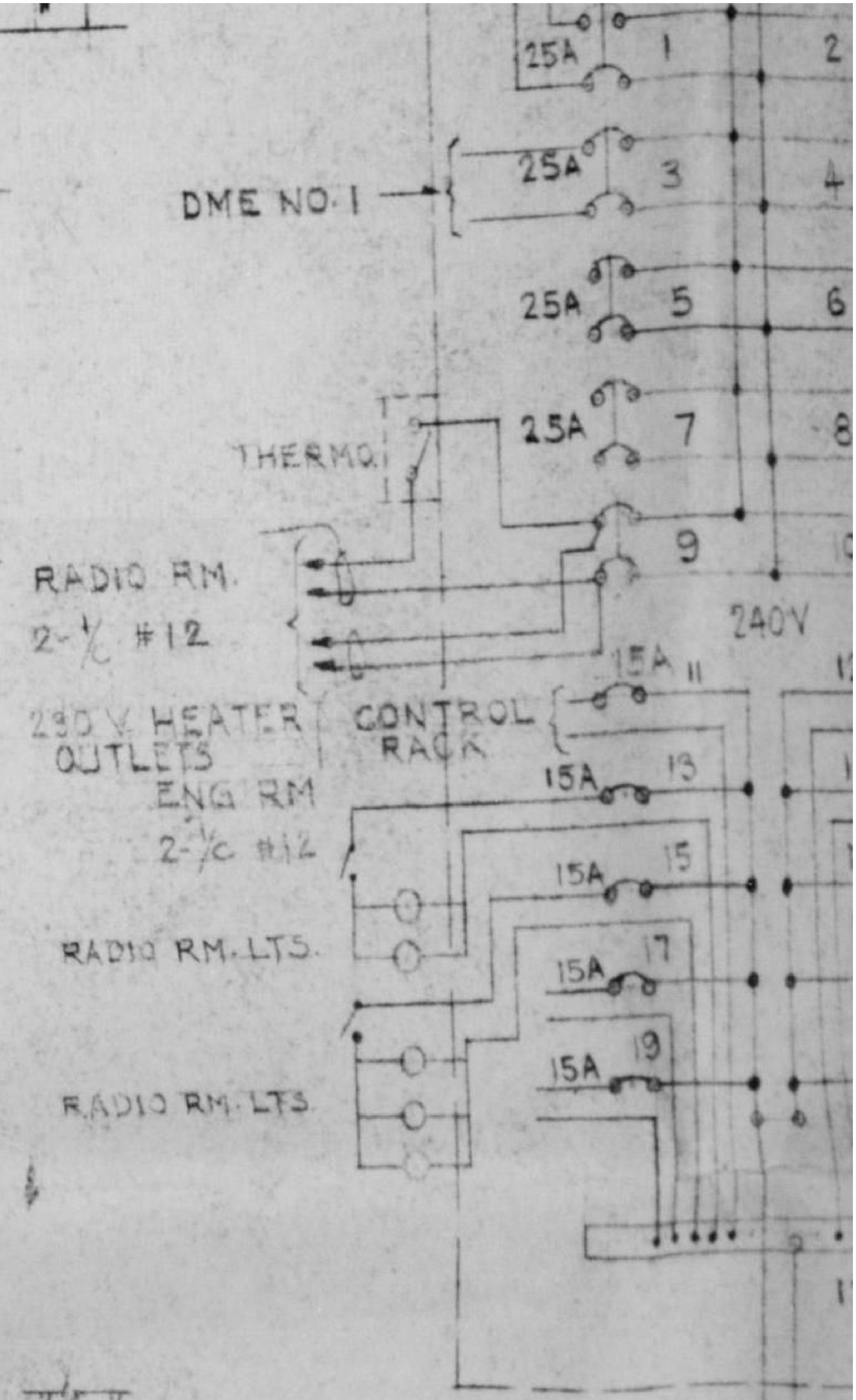
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

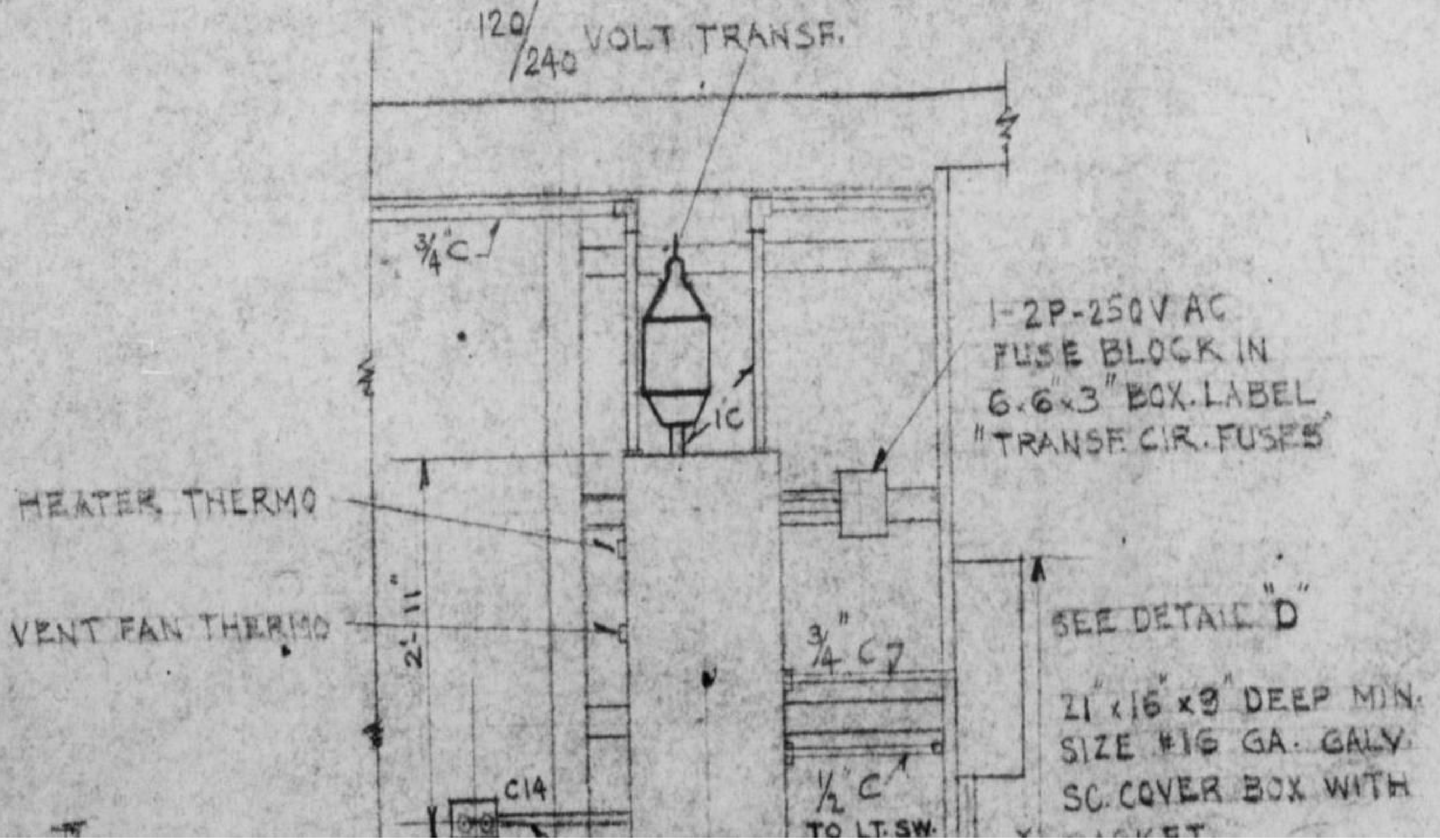
VHF OMNIRANGE
16'x36' TYPE S BLDG WITH CTR POISE ROOF
2-8 KVA ENG. GEN. INSTALLATION

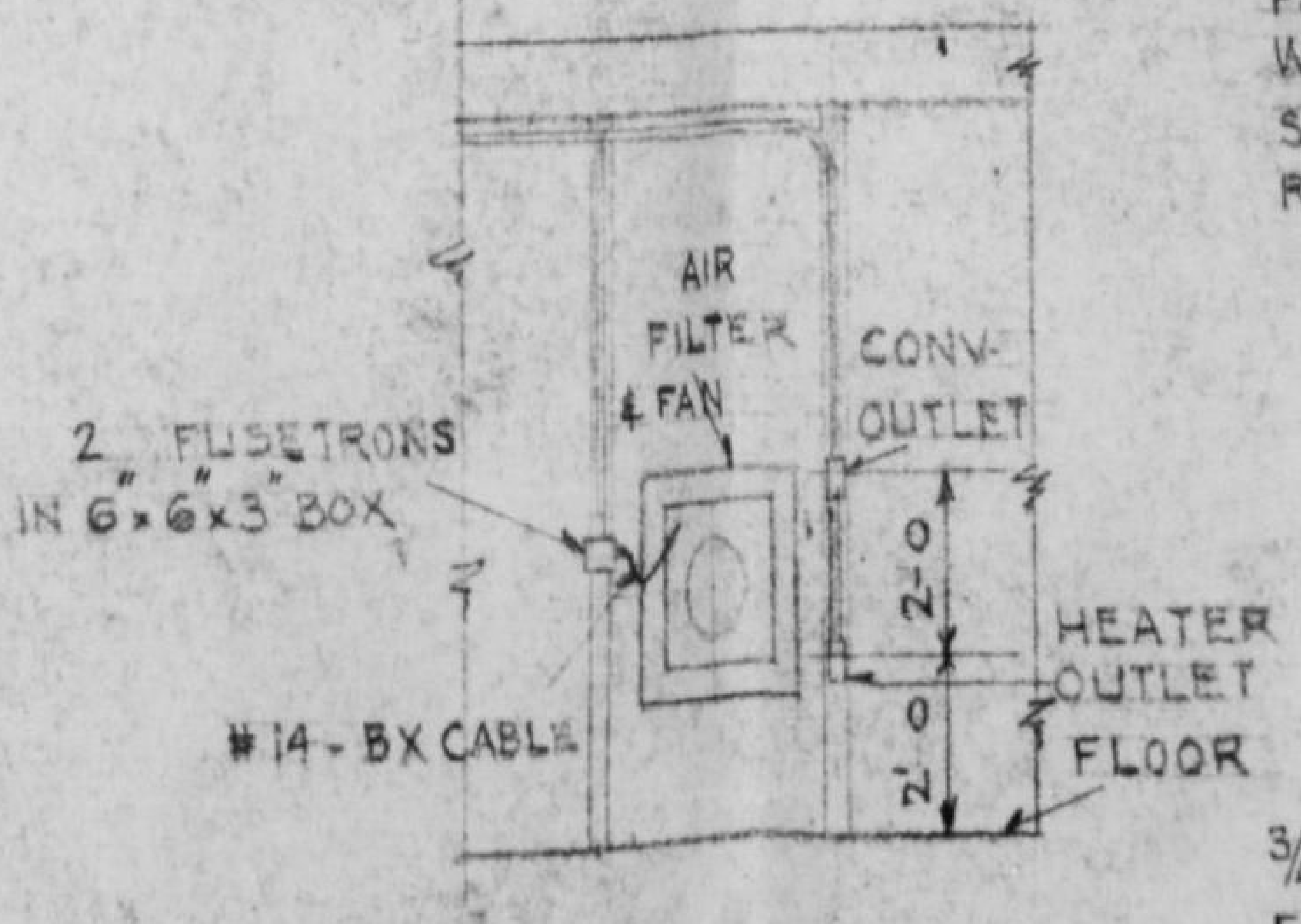

5'-0"
10'-0
E
3/4"C
F
G
1'-6"
OPENING THRU ROOF & CEILING
OUTLINE OF ANTENNA HOUSE ON COUNTER POISE
8'-0"
2'-0"
2'-11"
℄
OPENING
WEATHERTIGHT DUPLEX FLUSH RECEP. IN COUNTER POISE DECK ARROW #7890 OR EQUAL CONNECT TO CIRCUIT 14
F
C14
C9
C12
A
1/2"C
AIR FILTER
E
8'-0"
8'-0"
C-15
C-14
1'-3"
1"C
GRD. SEE DETAIL "C"
A
GRD.
CONTROL CABLE

WIRING PLAN

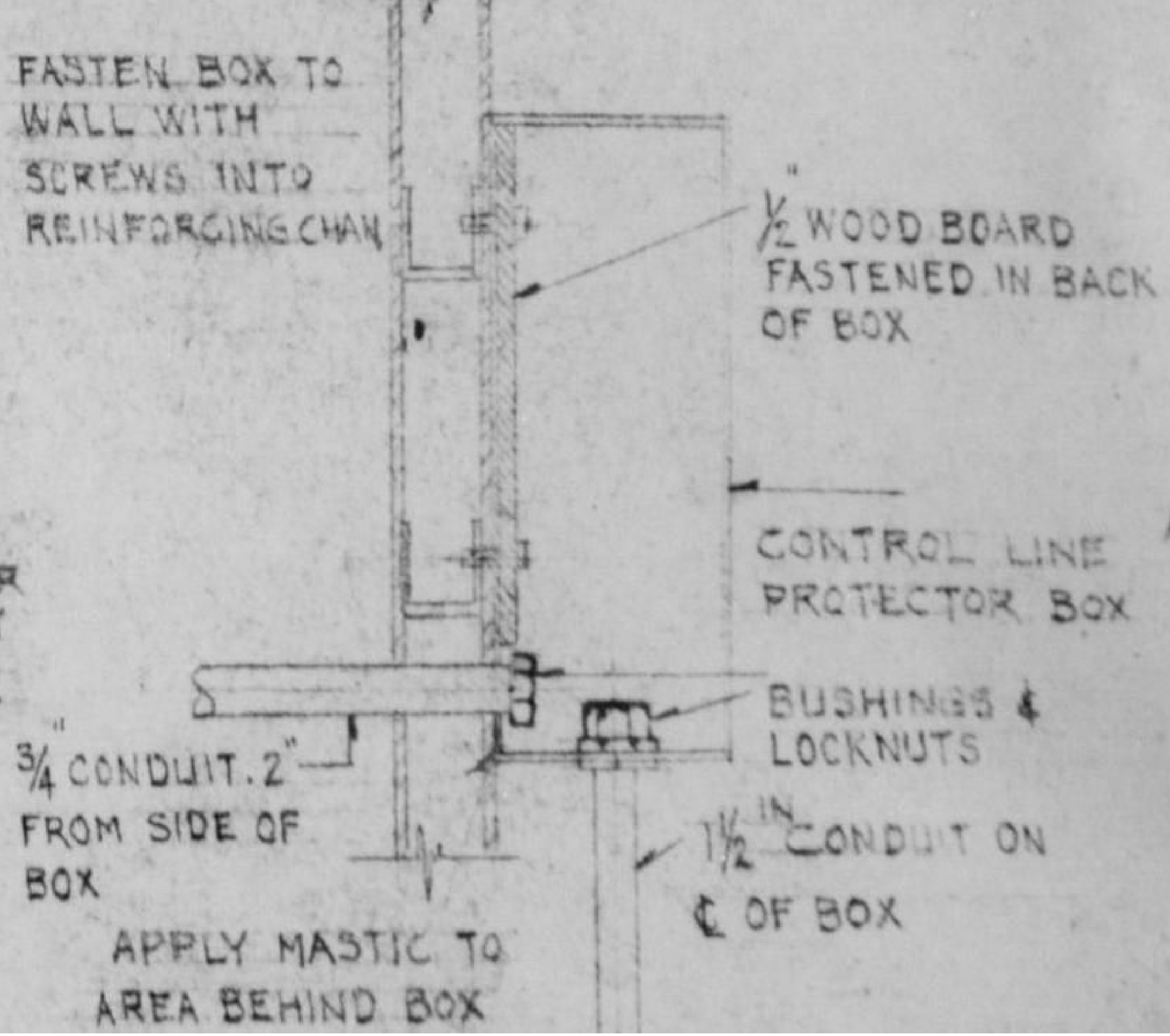
SECTION G-G



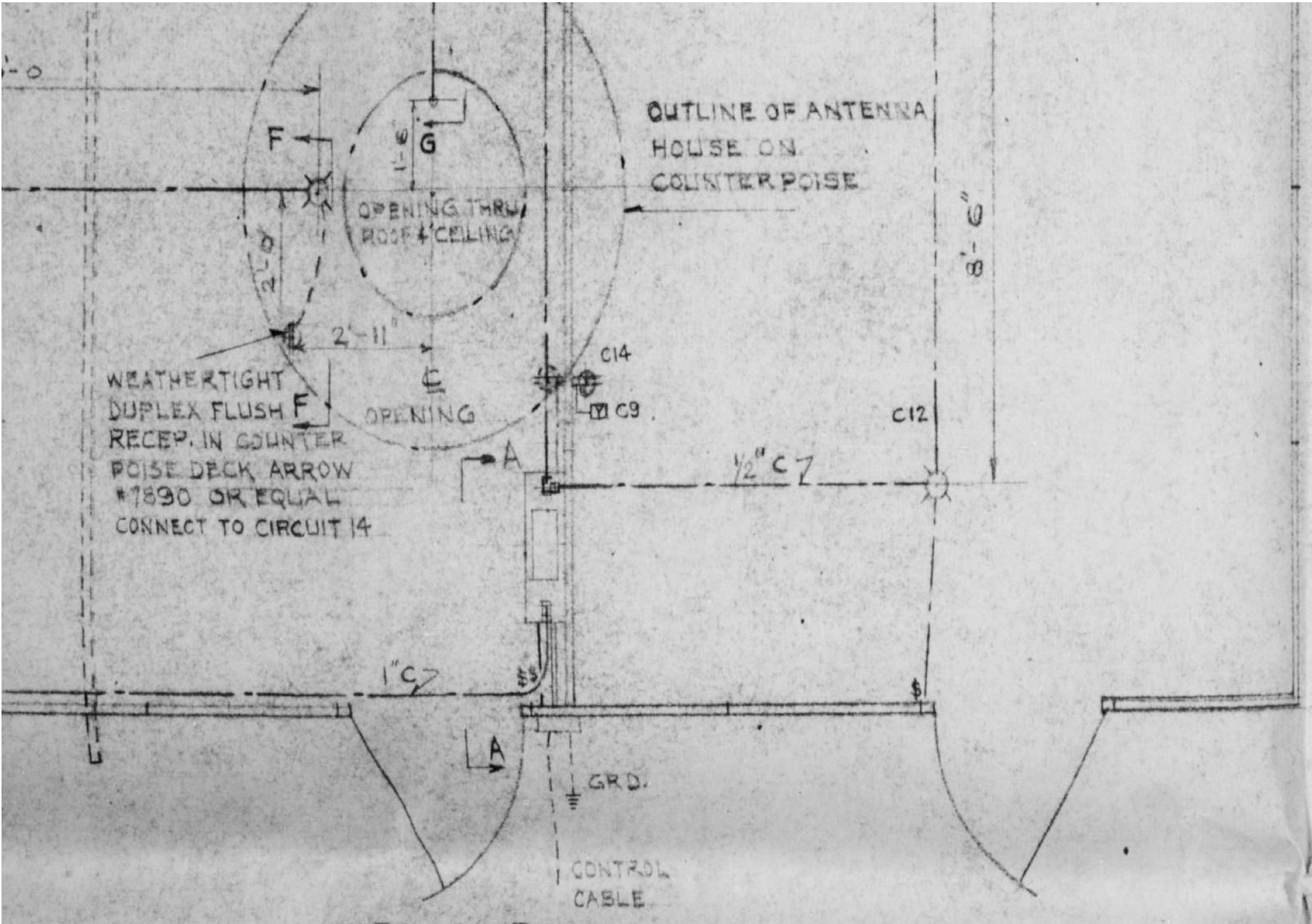

120/240 VOLT TRANSF.
3/4"C
1"C
1-2P-250V AC FUSE BLOCK IN 6.6×3" BOX. LABEL "TRANSF. CIR. FUSES"
HEATER THERMO
VENT FAN THERMO
2'-11"
SEE DETAIL "D"
3/4"C
21"×16"×9" DEEP MIN. SIZE #16 GA. GALV. SC. COVER BOX WITH
1/2"C TO LT. SW.
C14



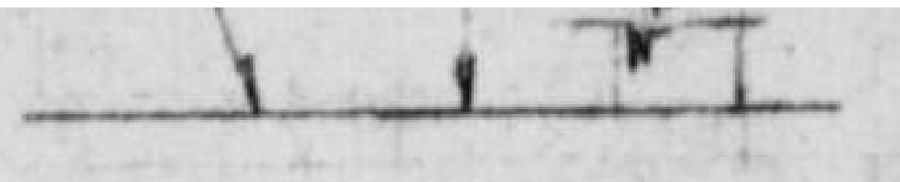
SECTION E-E


FASTEN BOX TO WALL WITH SCREWS INTO REINFORCING CHAN.
1/2" WOOD BOARD FASTENED IN BACK OF BOX
CONTROL LINE PROTECTOR BOX
BUSHINGS & LOCKNUTS
3/4 CONDUIT. 2" FROM SIDE OF BOX
1 1/2 IN. CONDUIT ON ℄ OF BOX
APPLY MASTIC TO AREA BEHIND BOX

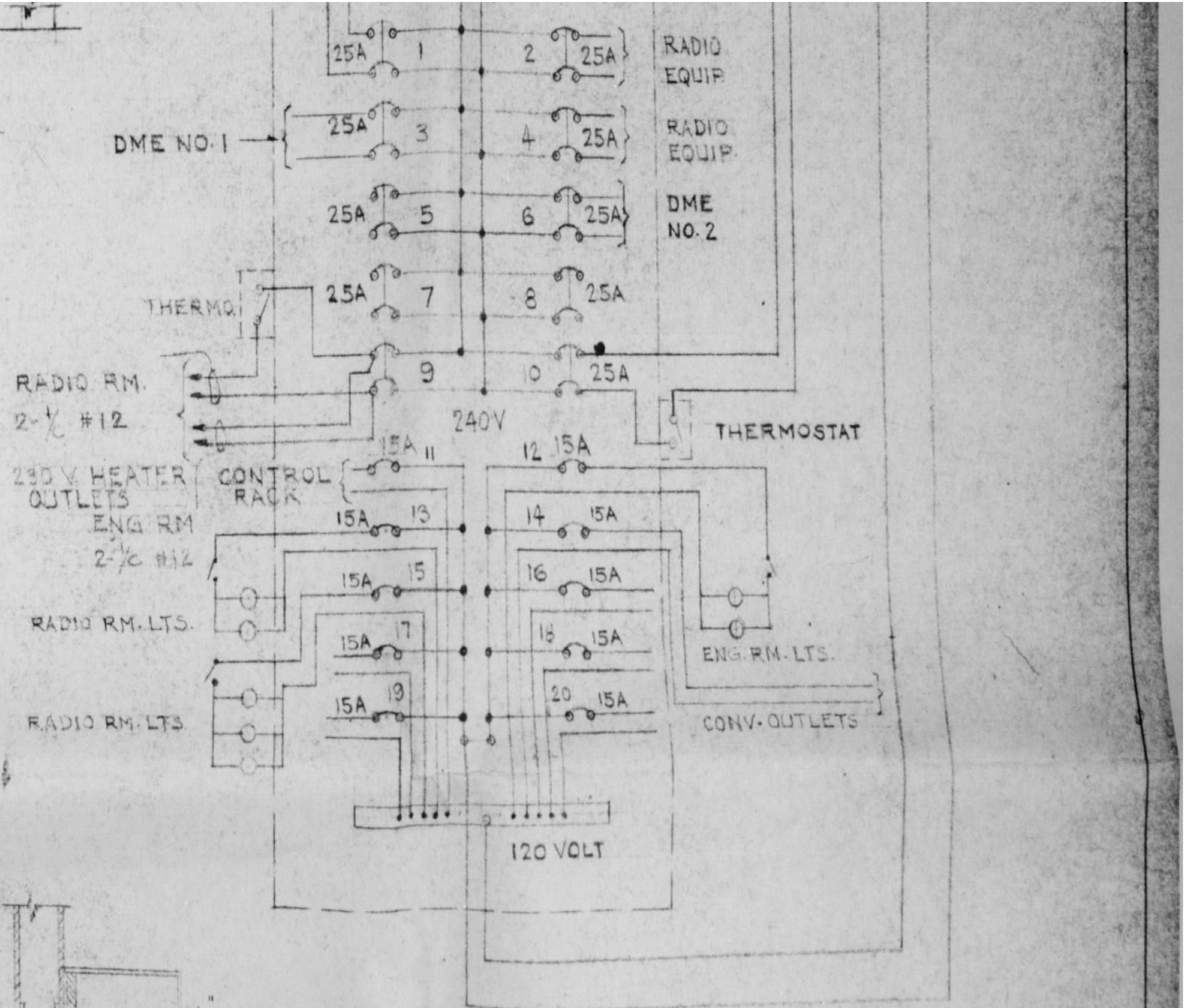
WIRIN
ALL WIRE


F
G
OUTLINE OF ANTENNA HOUSE ON COUNTERPOISE
OPENING THRU ROOF & CEILING
8'-0"
2'-11"
℄ OPENING
WEATHERTIGHT DUPLEX FLUSH RECEP. IN COUNTER POISE DECK ARROW #7890 OR EQUAL CONNECT TO CIRCUIT 14
F
C14
C9
C12
A
1/2" C
1" C
A
GRD.
CONTROL CABLE

WIRING PLAN

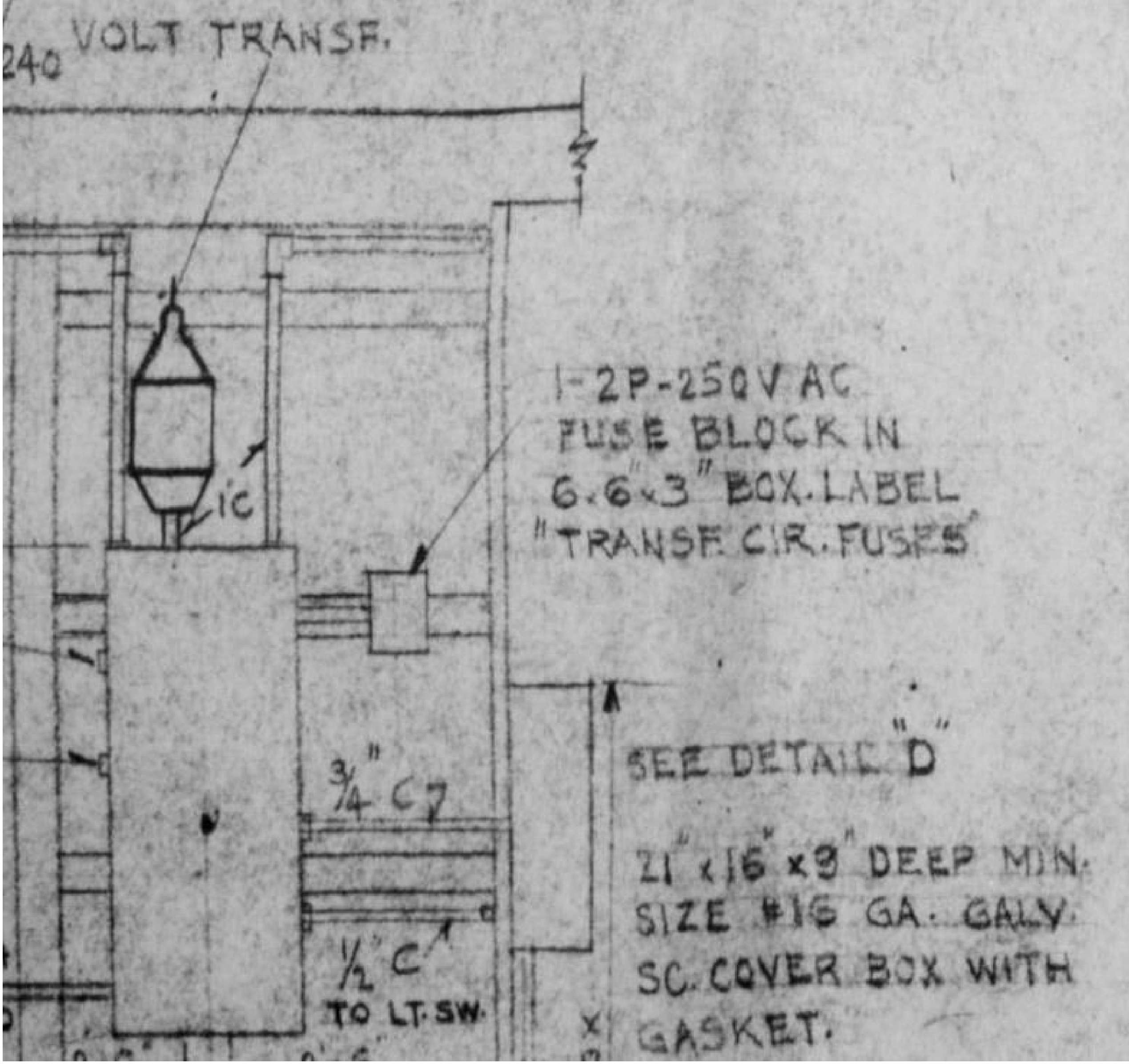


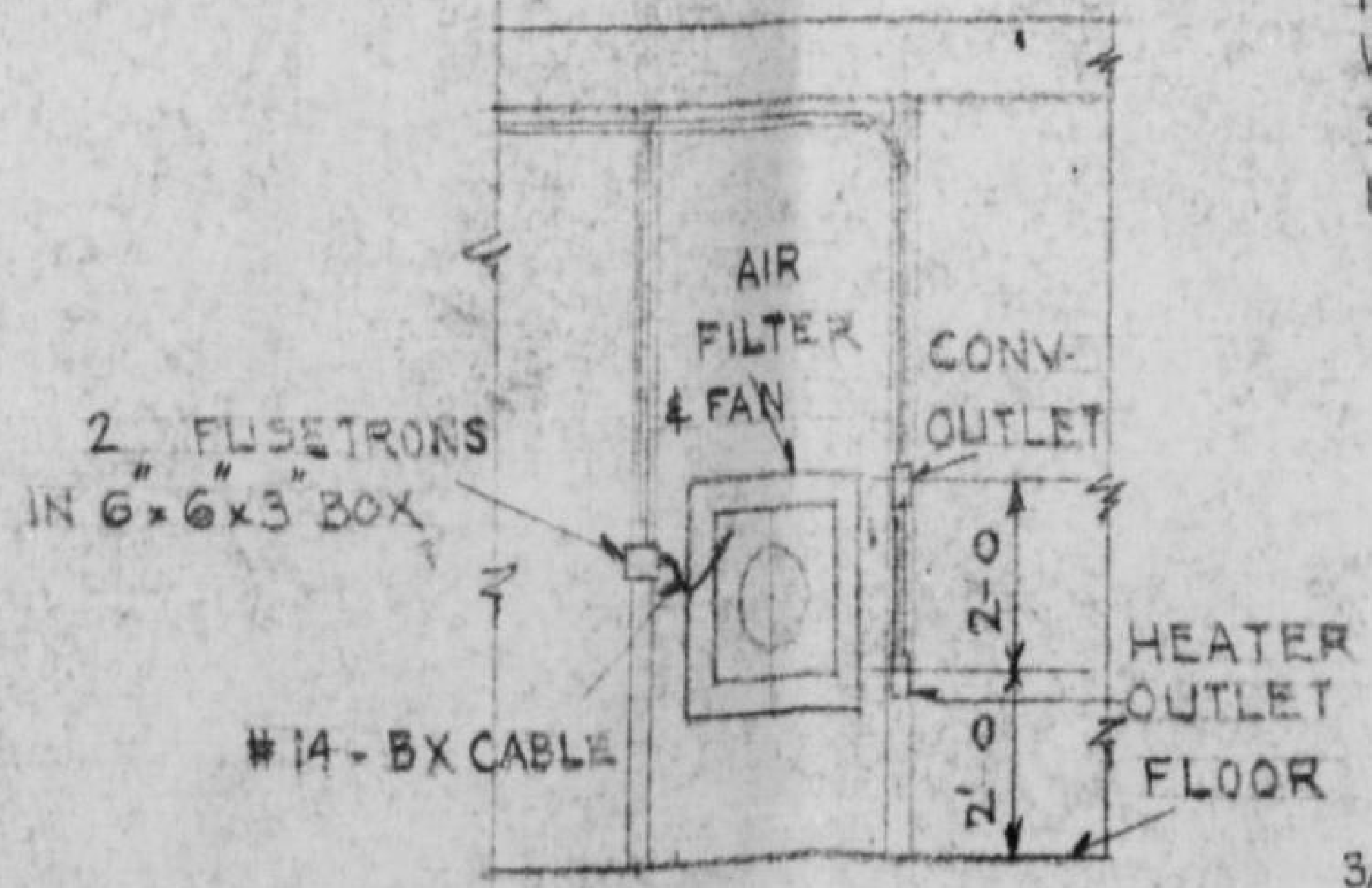
SECTION G-G



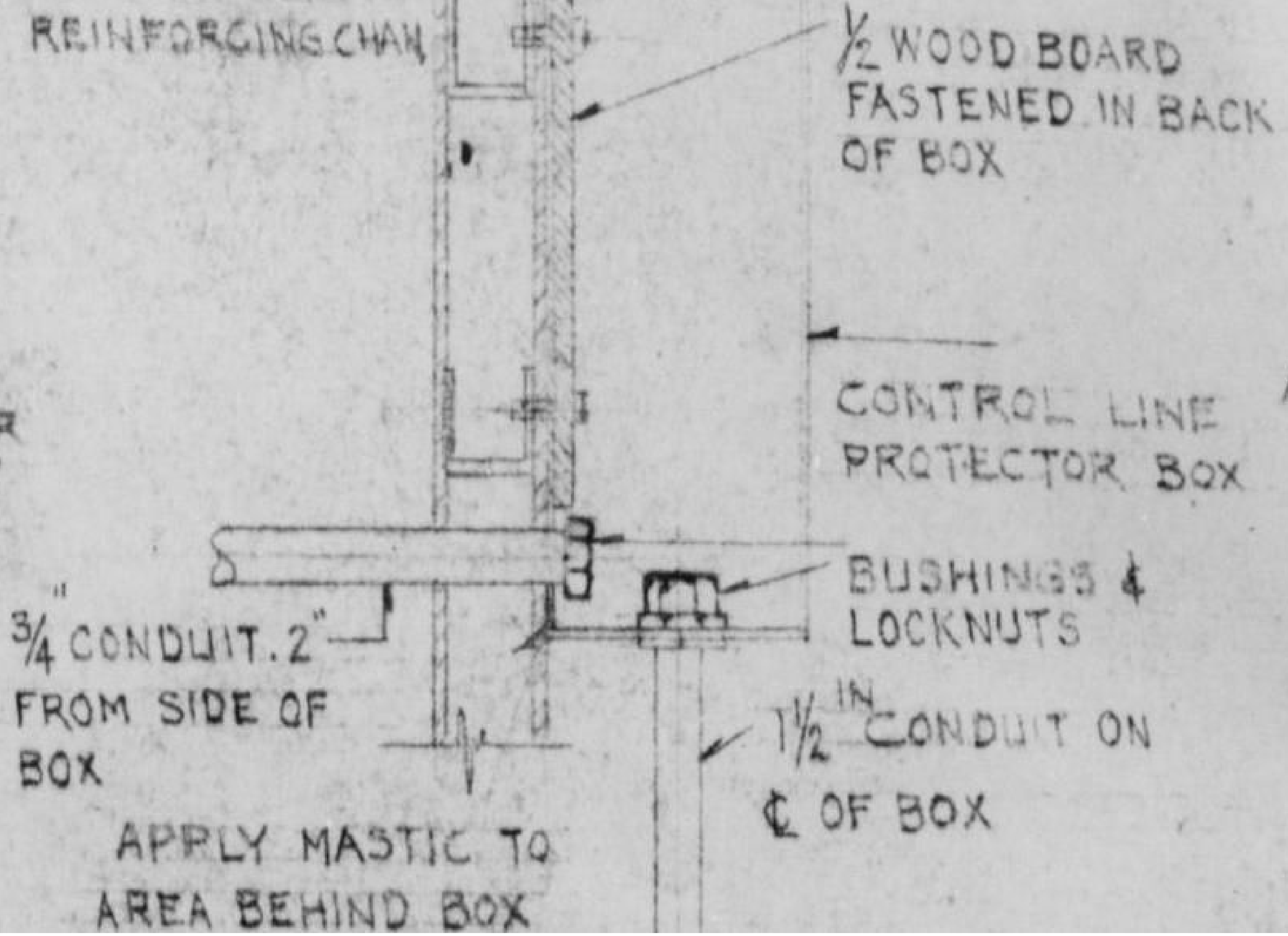
WIRING DIAGRAM

ALL WIRE NO.14 UNLESS OTHERWISE NOTED


240 VOLT TRANSF.
1"C
1-2P-250V AC FUSE BLOCK IN 6"x6"x3" BOX. LABEL "TRANSF CIR. FUSES"
3/4"C
1/2"C TO LT. SW.
SEE DETAIL "D"
21"x16"x9" DEEP MIN. SIZE #16 GA. GALV. SC. COVER BOX WITH GASKET.



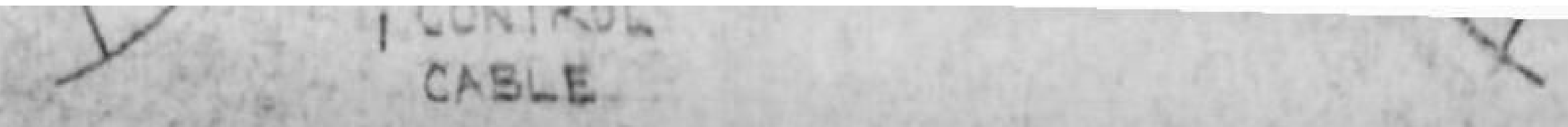
SECTION E-E


FASTEN BOX TO WALL WITH SCREWS INTO REINFORCING CHAN.
1/2" WOOD BOARD FASTENED IN BACK OF BOX
CONTROL LINE PROTECTOR BOX
BUSHINGS & LOCKNUTS
3/4" CONDUIT. 2" FROM SIDE OF BOX
1 1/2 IN CONDUIT ON ℄ OF BOX
APPLY MASTIC TO AREA BEHIND BOX

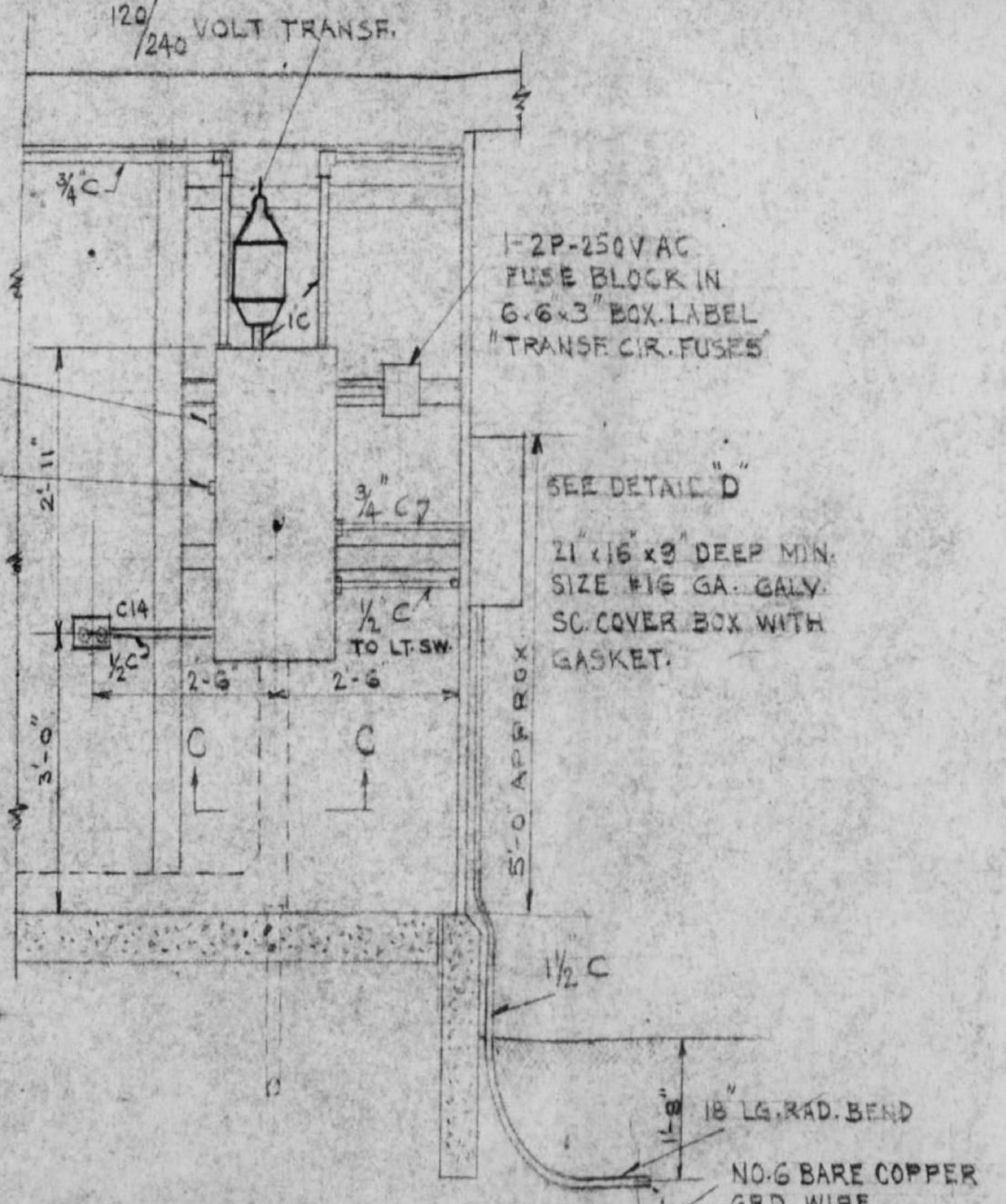
NOTES

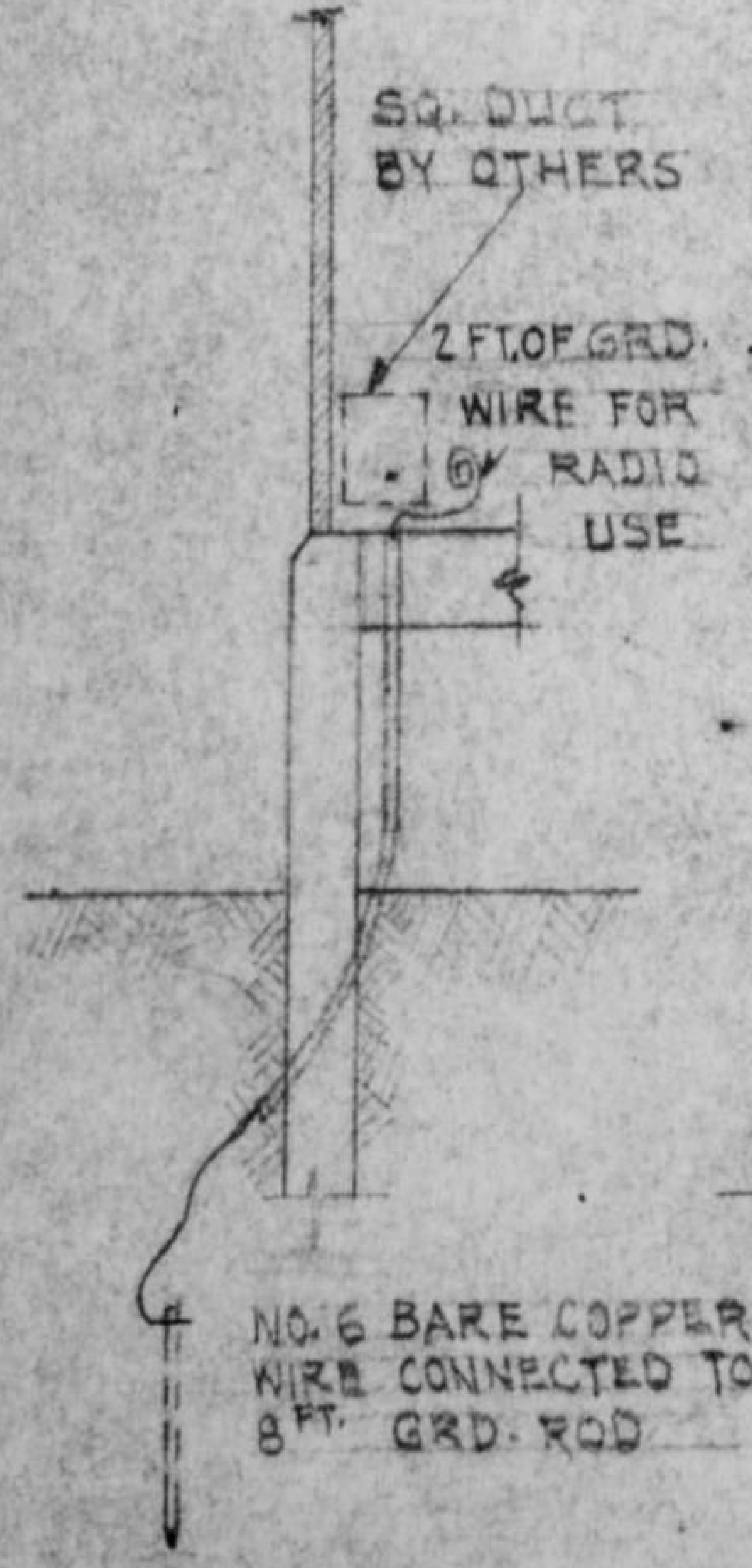
1 THE WIRE AND CONDUIT SIZES SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

2 SET SPACE HEATER ON FLOOR AND PLUG FLEXIBLE CORD INTO OUTLET.



WIRING PLAN

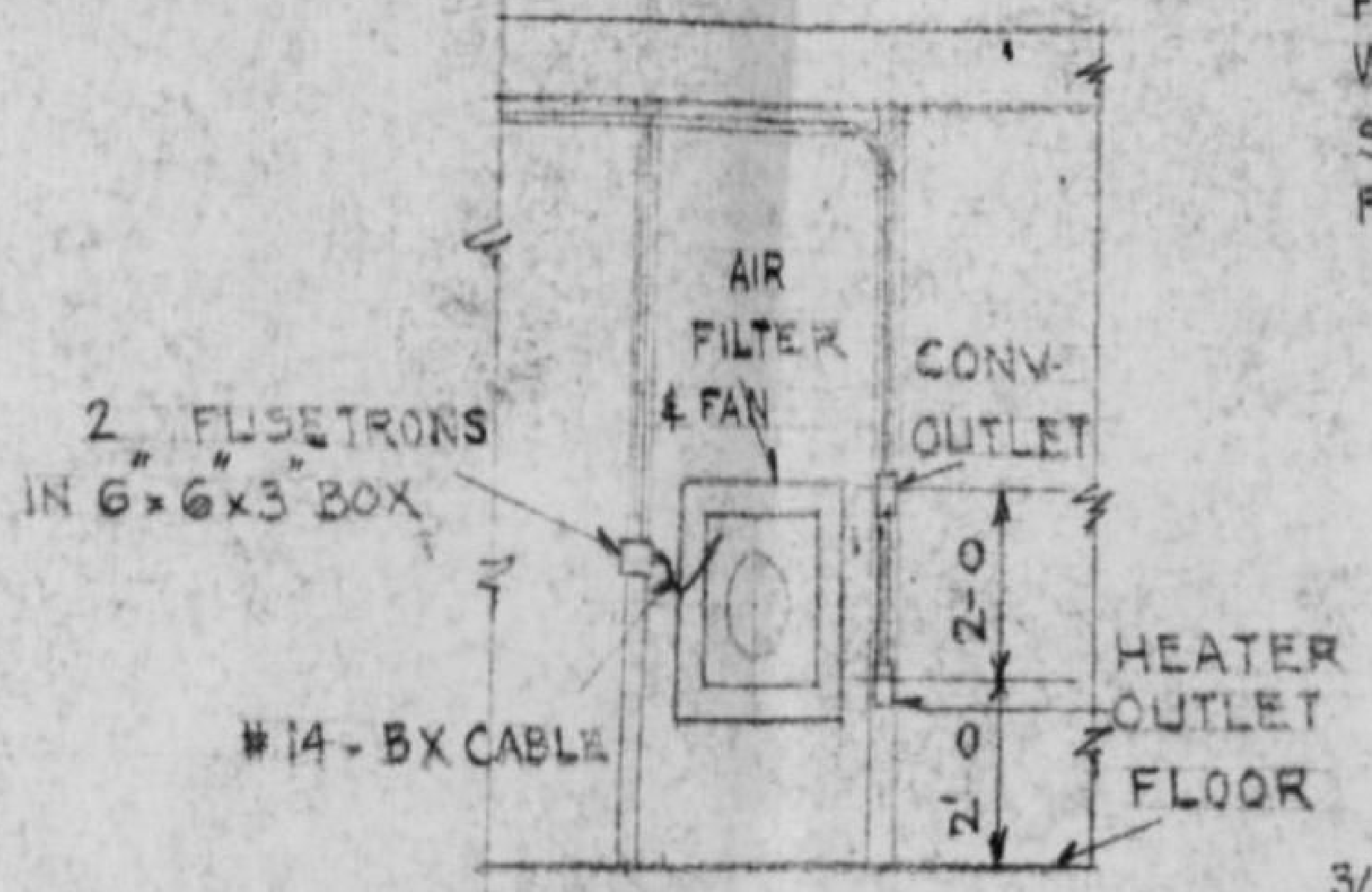



SQ. DUCT BY OTHERS
2 FT. OF GRD. WIRE FOR RADIO USE
#6
NO. 6 BARE COPPER WIRE CONNECTED TO 5/8" 8FT. GRD. ROD

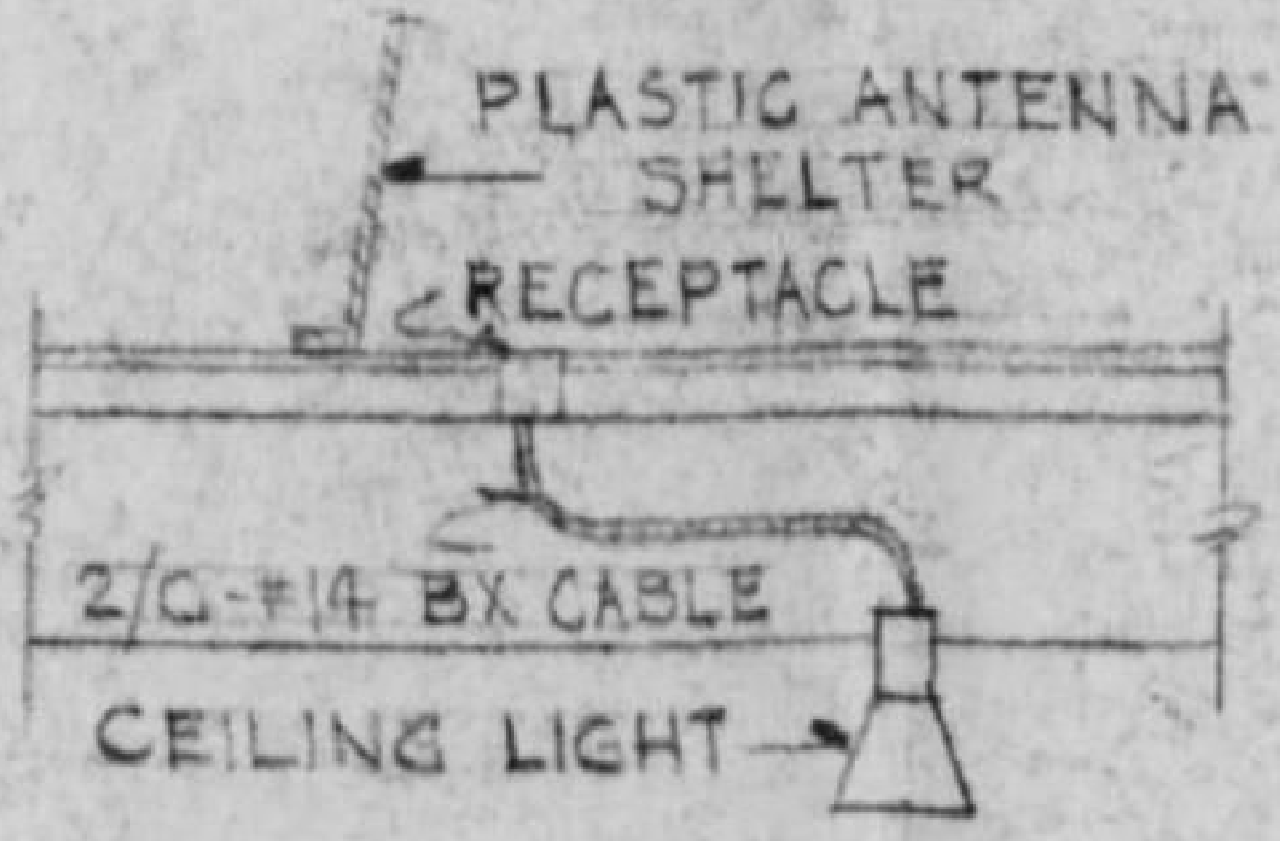
DETAIL "C"

POWER DISTRIBUTION PANEL MOUNTING DETAIL

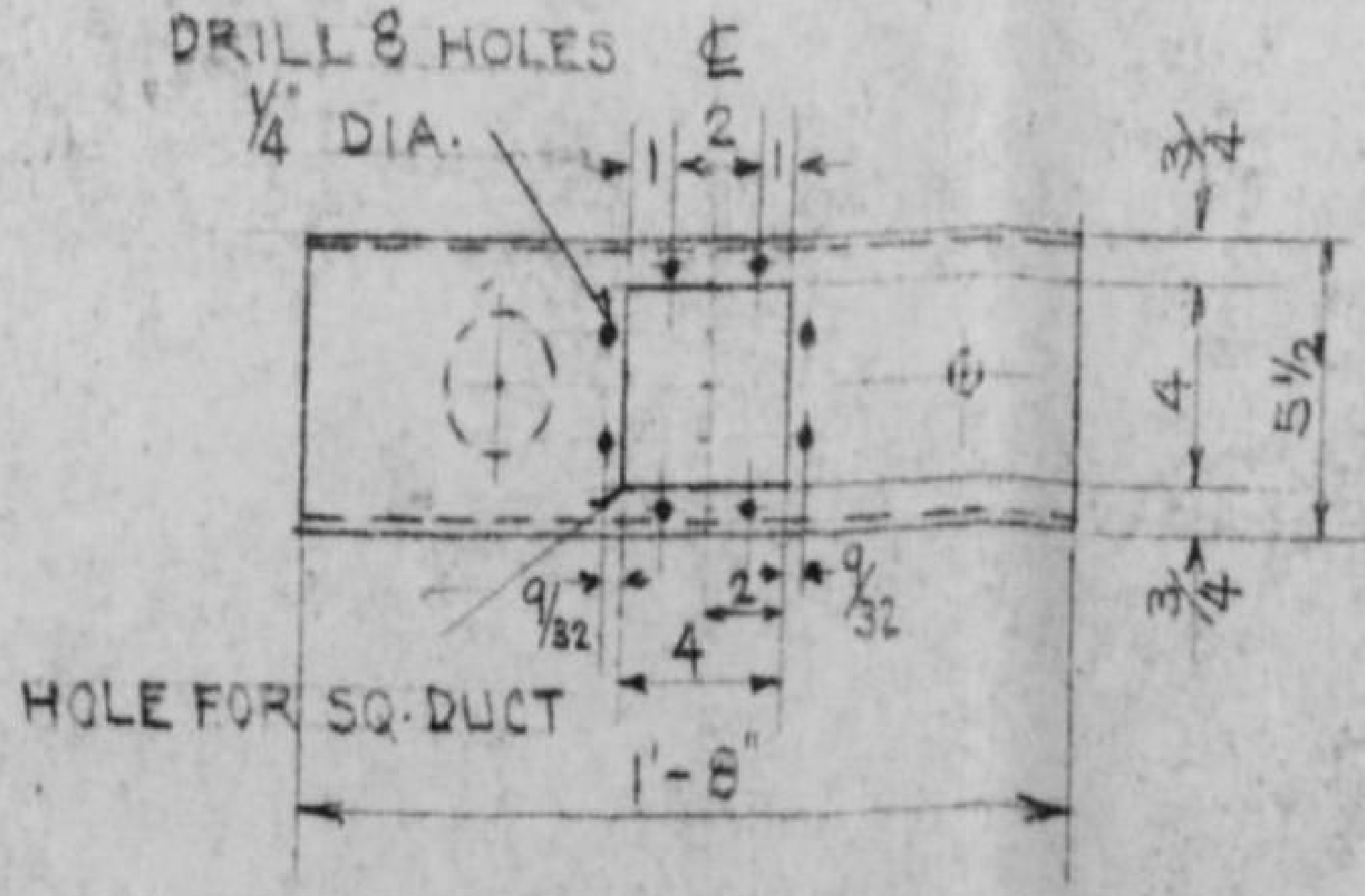
VIEW A-A



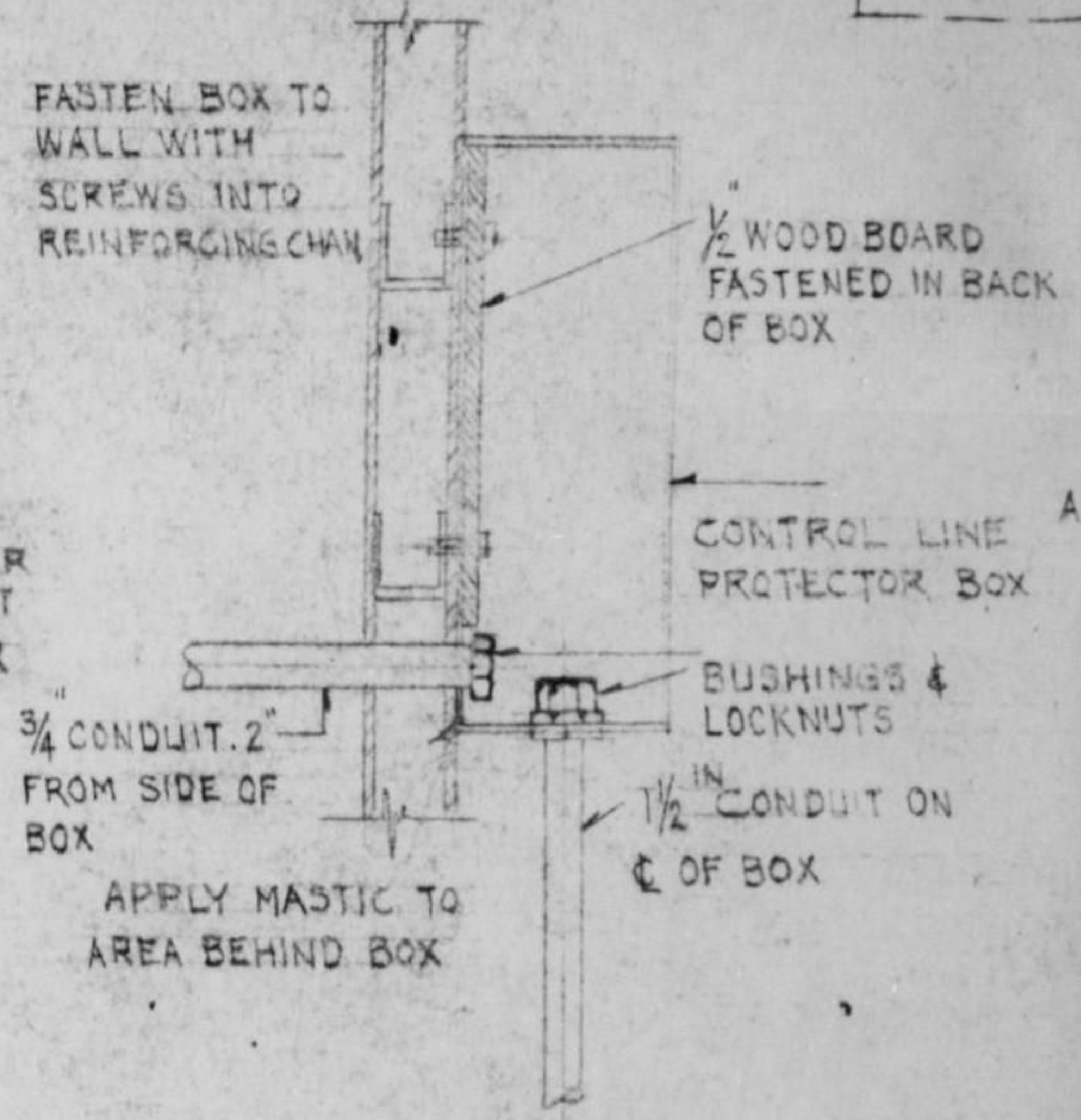
SECTION E-E



SECTION F-F



VIEW C-C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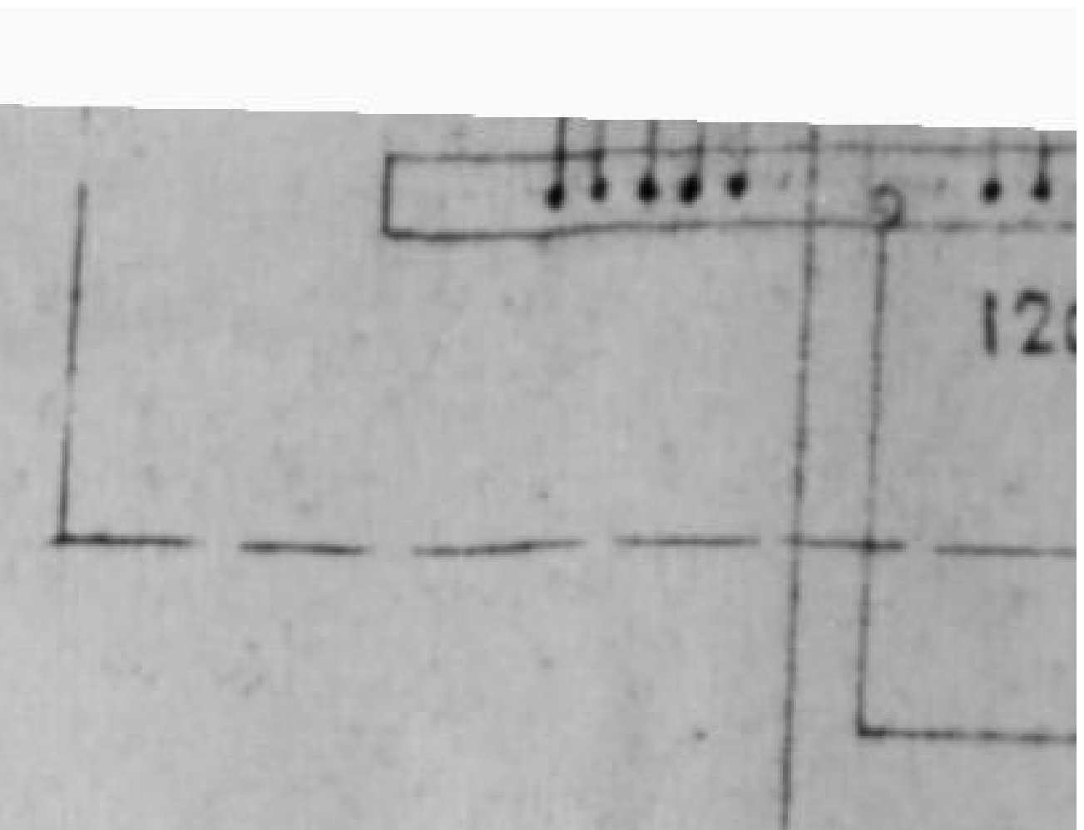
1 1/2 IN. CONDUIT ON ℄ OF BOX
APPLY MASTIC TO AREA BEHIND BOX

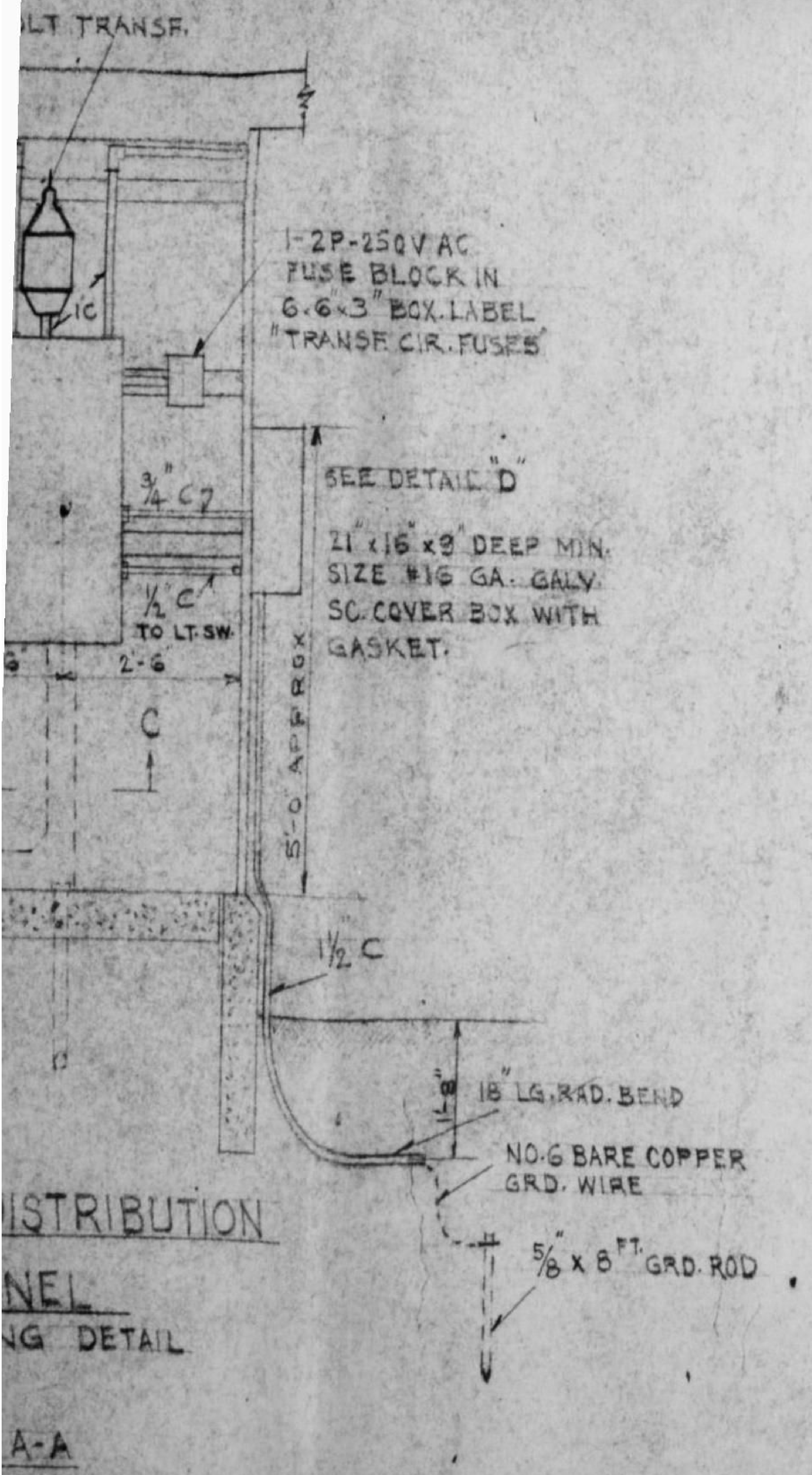
DETAIL "D"



WIRING

ALL WIRE NO.

WIRING PLAN

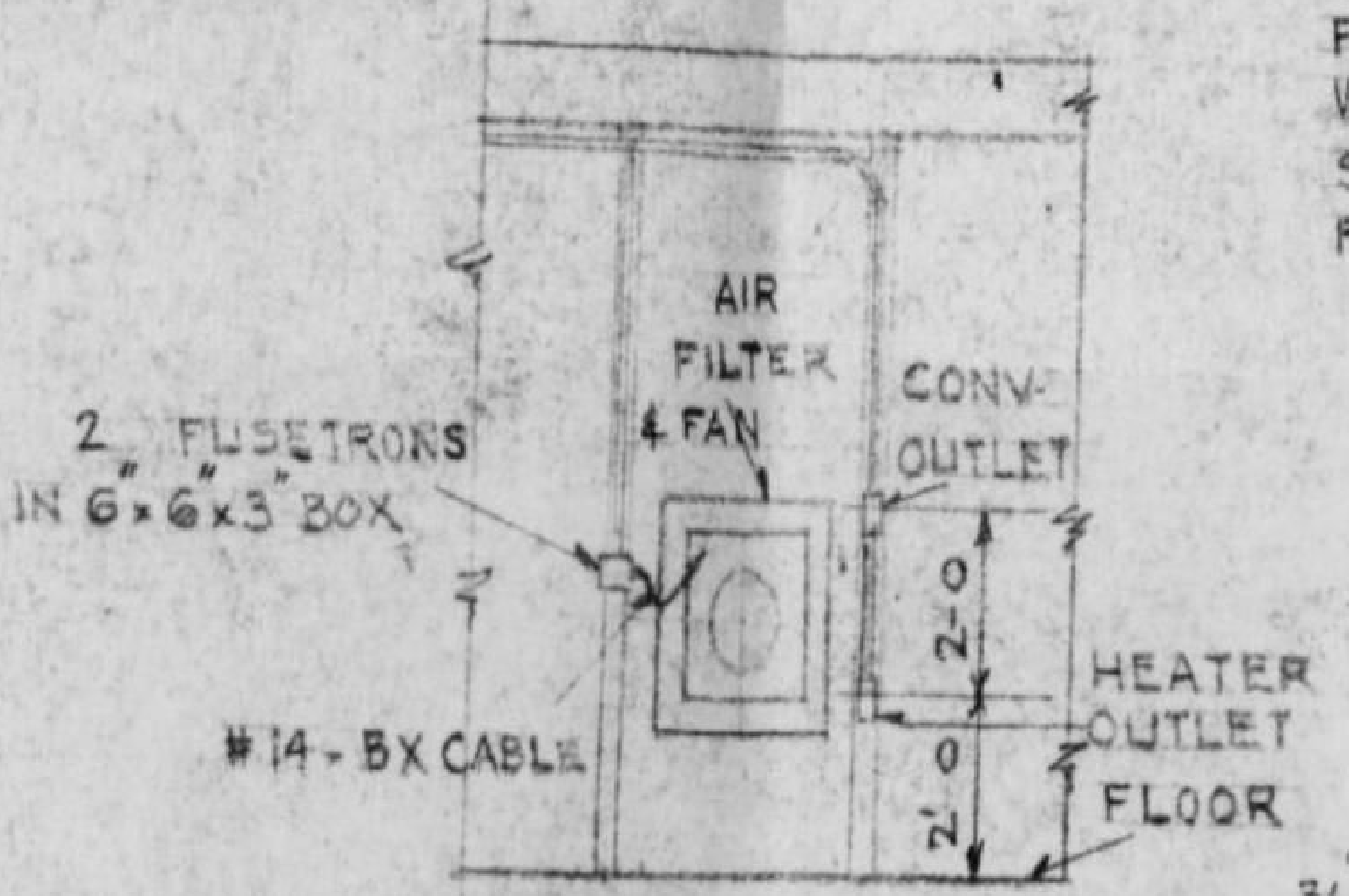


ISTRIBUTION

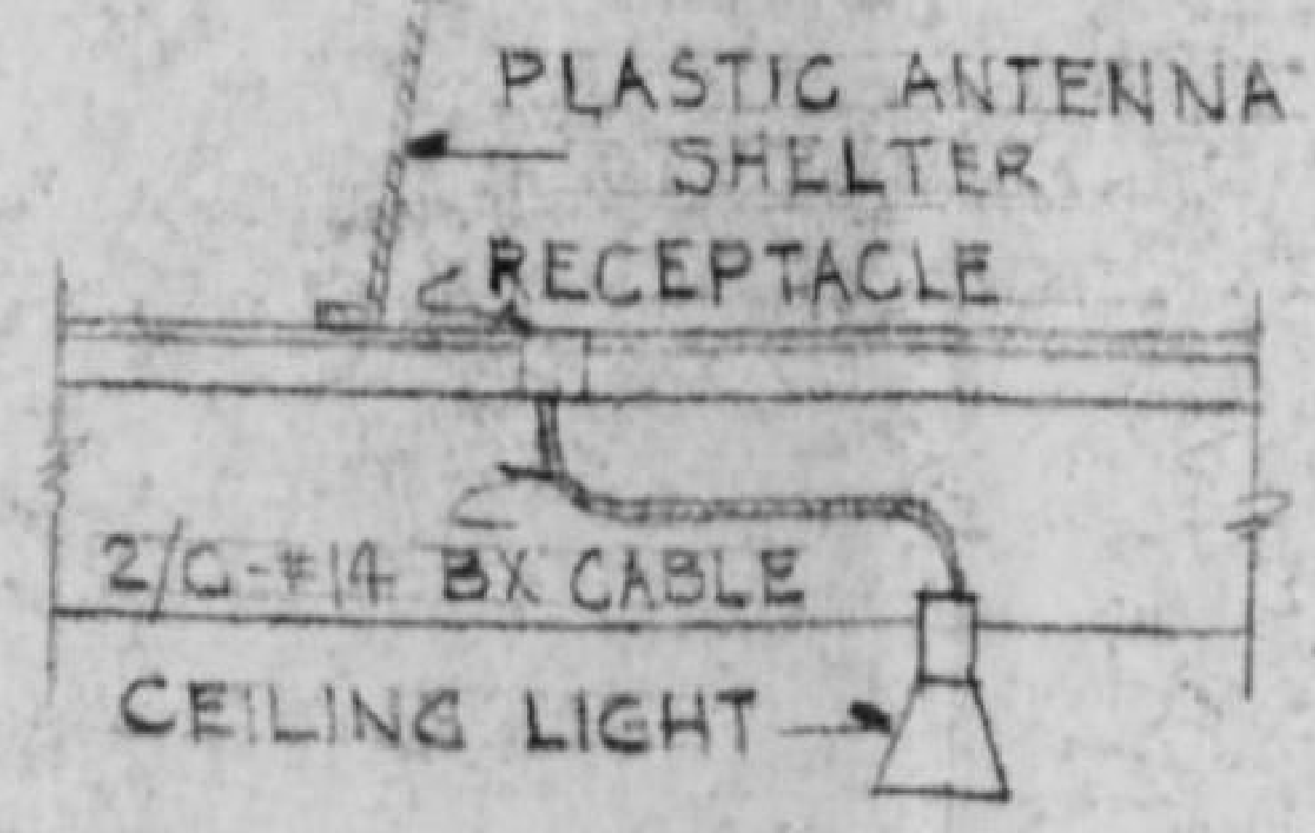
NEL

NG DETAIL

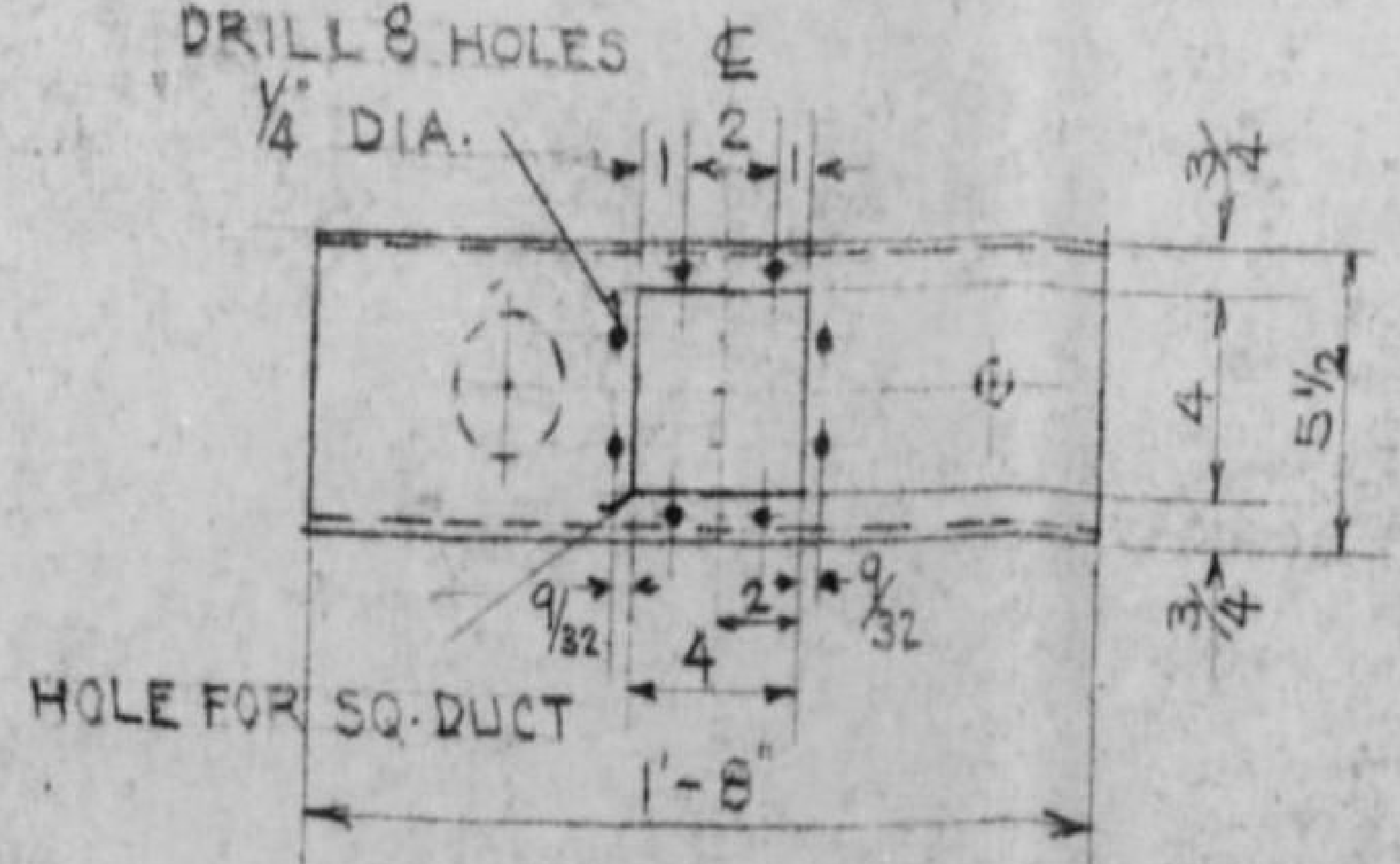
A-A



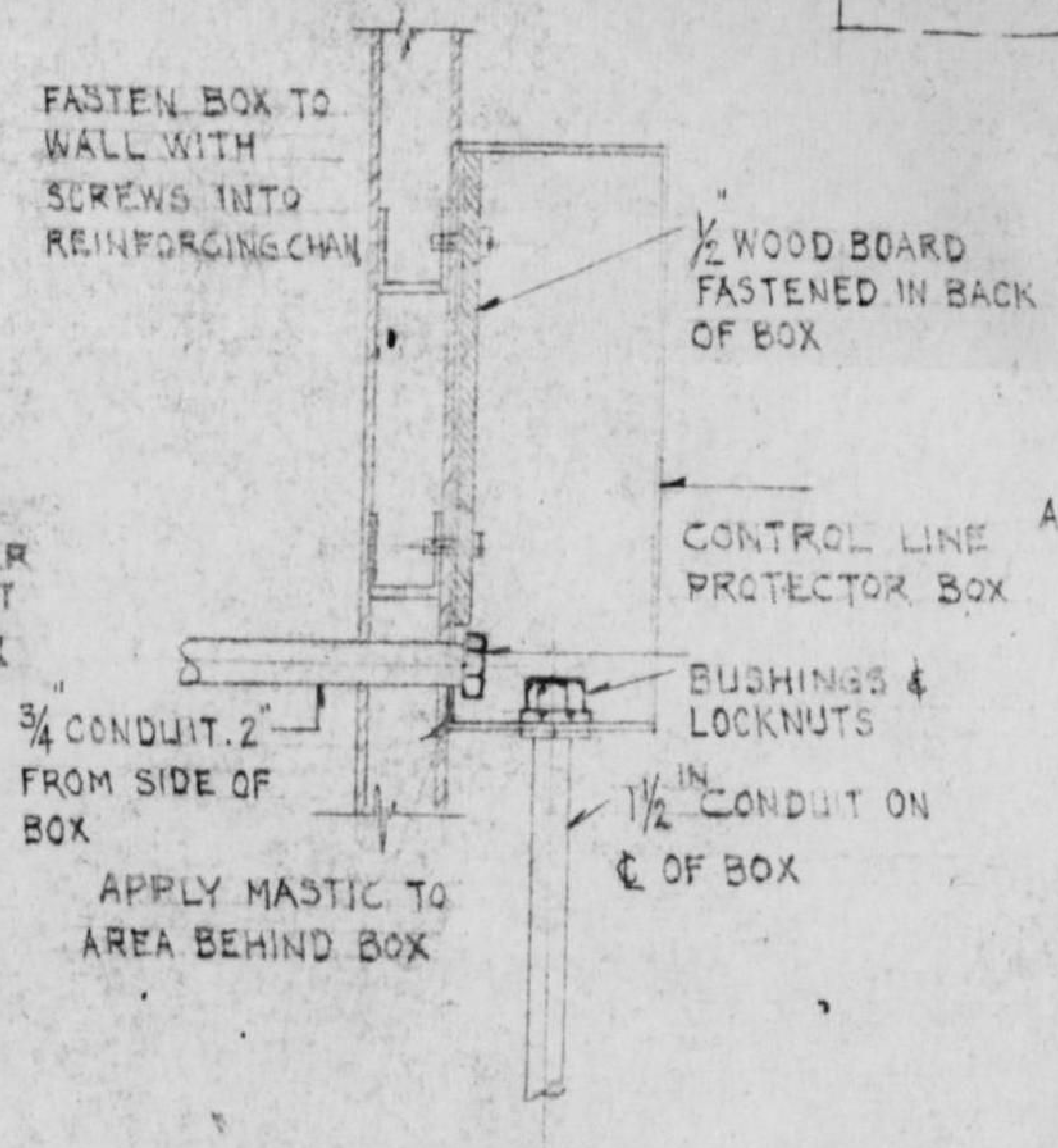
SECTION E-E



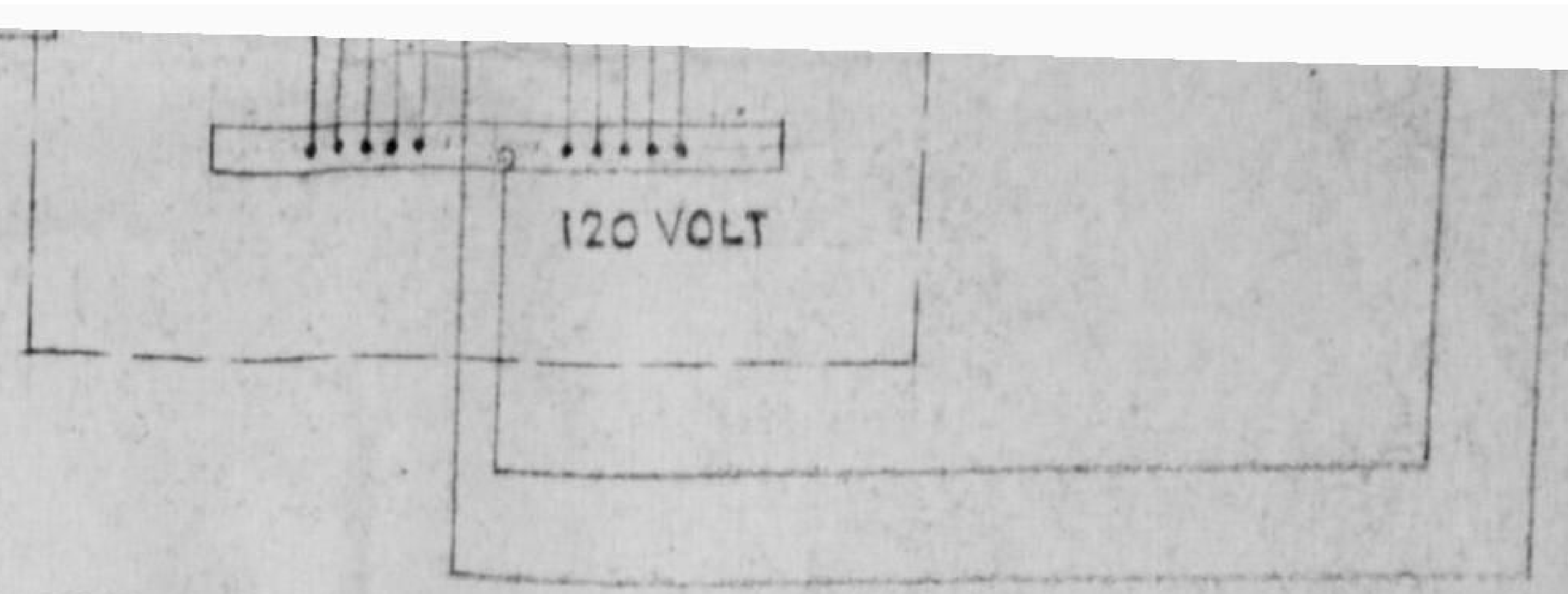
SECTION F-F



VIEW C-C



DETAIL "D"



WIRING DIAGRAM

ALL WIRE NO.14 UNLESS OTHERWISE NOTED

NOTES

1 THE WIRE AND CONDUIT SIZES SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

2 SET SPACE HEATER ON FLOOR AND PLUG FLEXIBLE CORD INTO OUTLET.

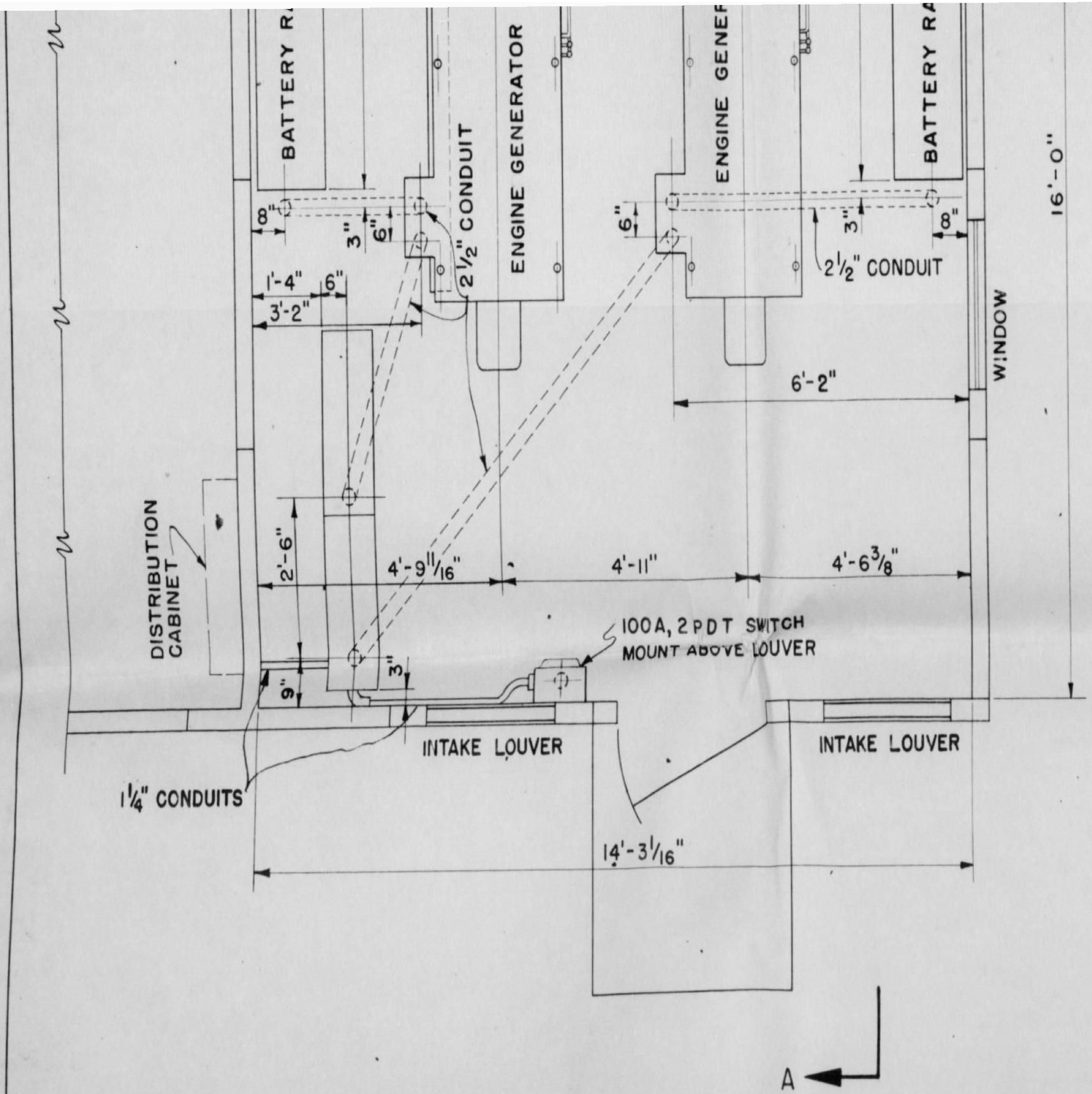
3 ALL CONDUIT AND FITTINGS TO BE GALVANIZED. CONDUIT SIZES SHOWN ARE MINIMUM. ONE SIZE LARGER MAY BE SUBSTITUTED IF DESIRED.

4 GROUND ONE SIDE OF ALL 120 V BRANCH CIR.

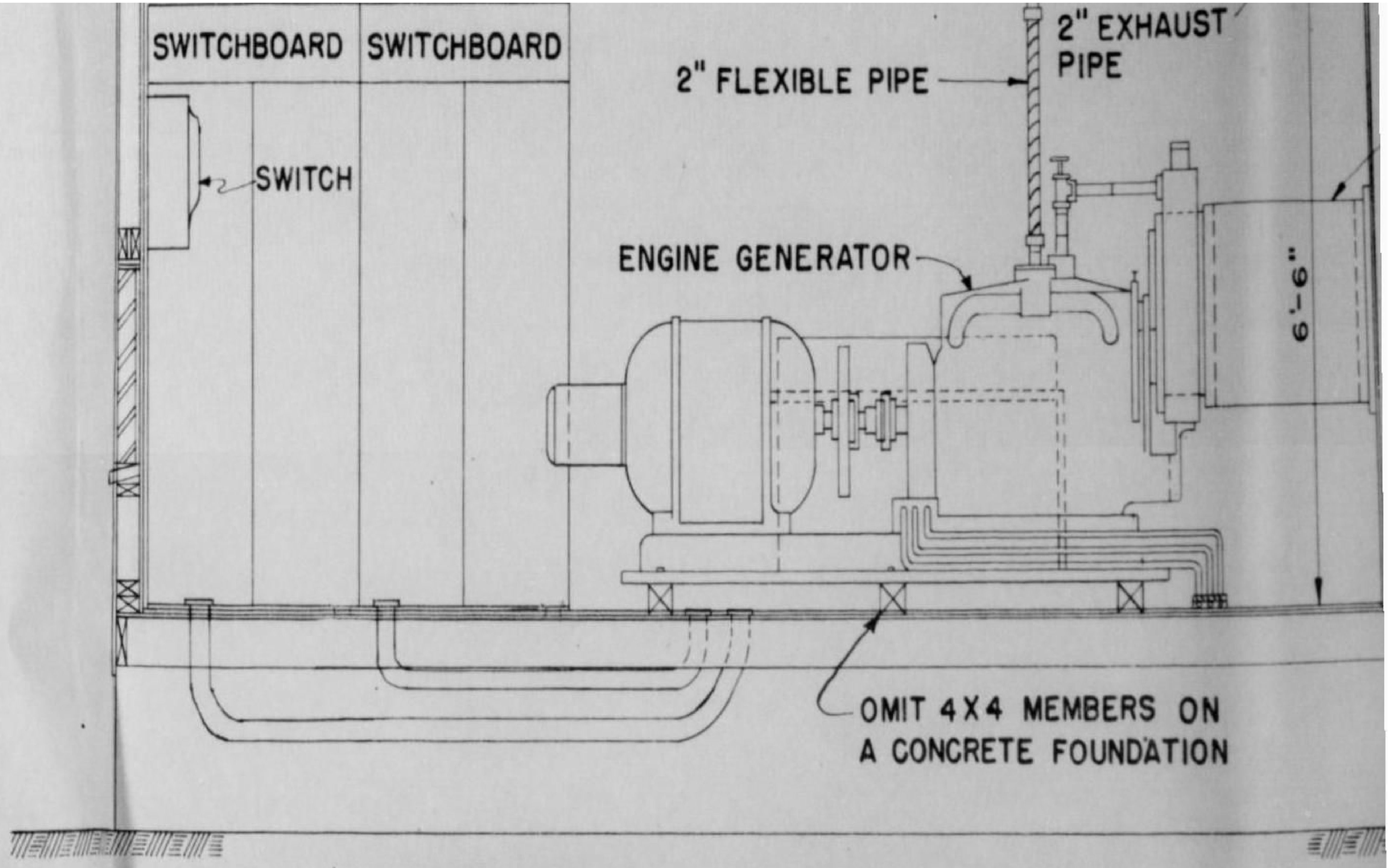
5 ALL FIXTURES RLM DOME TYPE WITH 150 WATT LAMPS.

CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS
ESTABLISHMENT ENGINEERING DIVISION

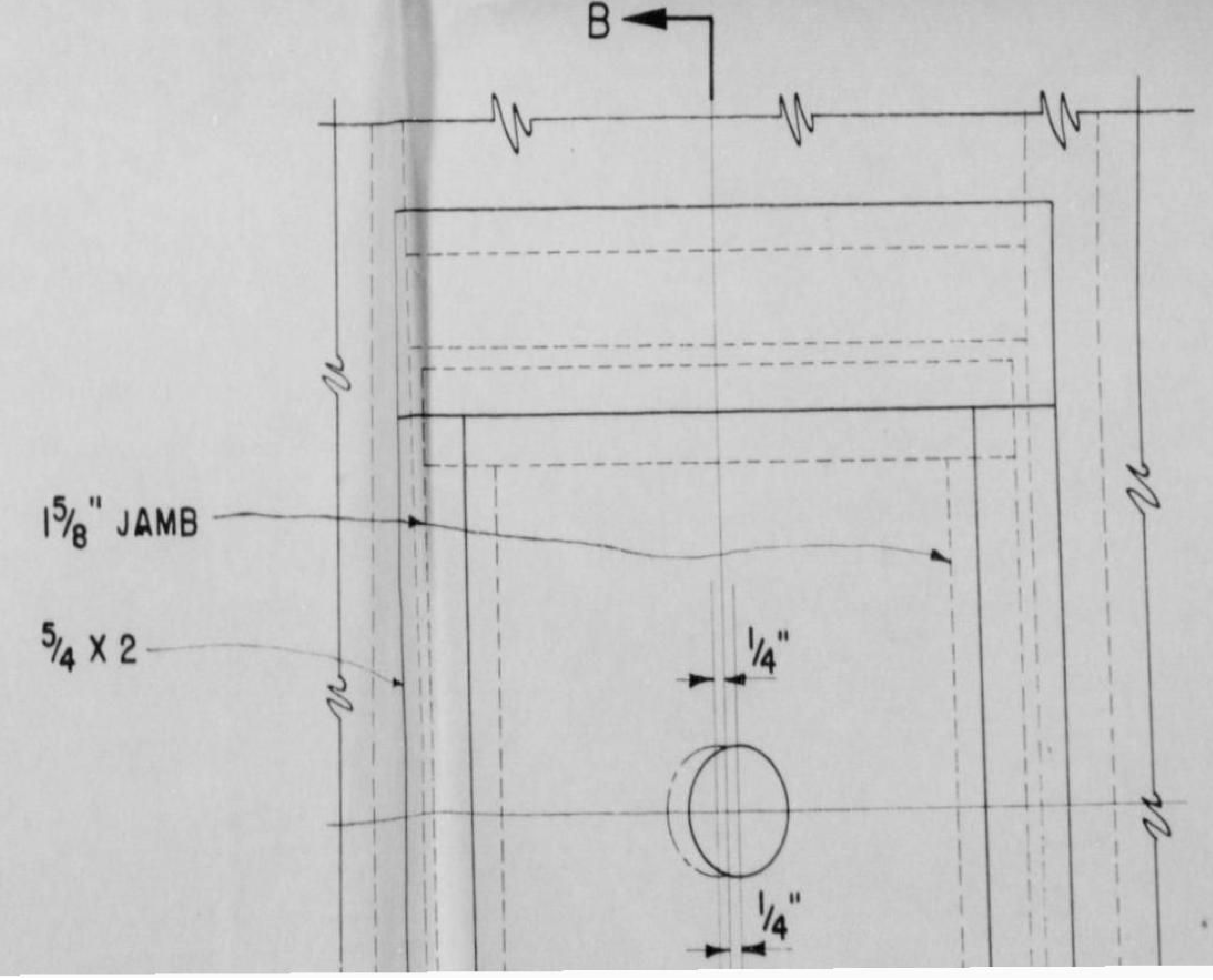
VHF OMNIRANGE
16'x36' TYPE S BLDG WITH COUNTERPOISE ROOF
ELECTRICAL LAYOUT

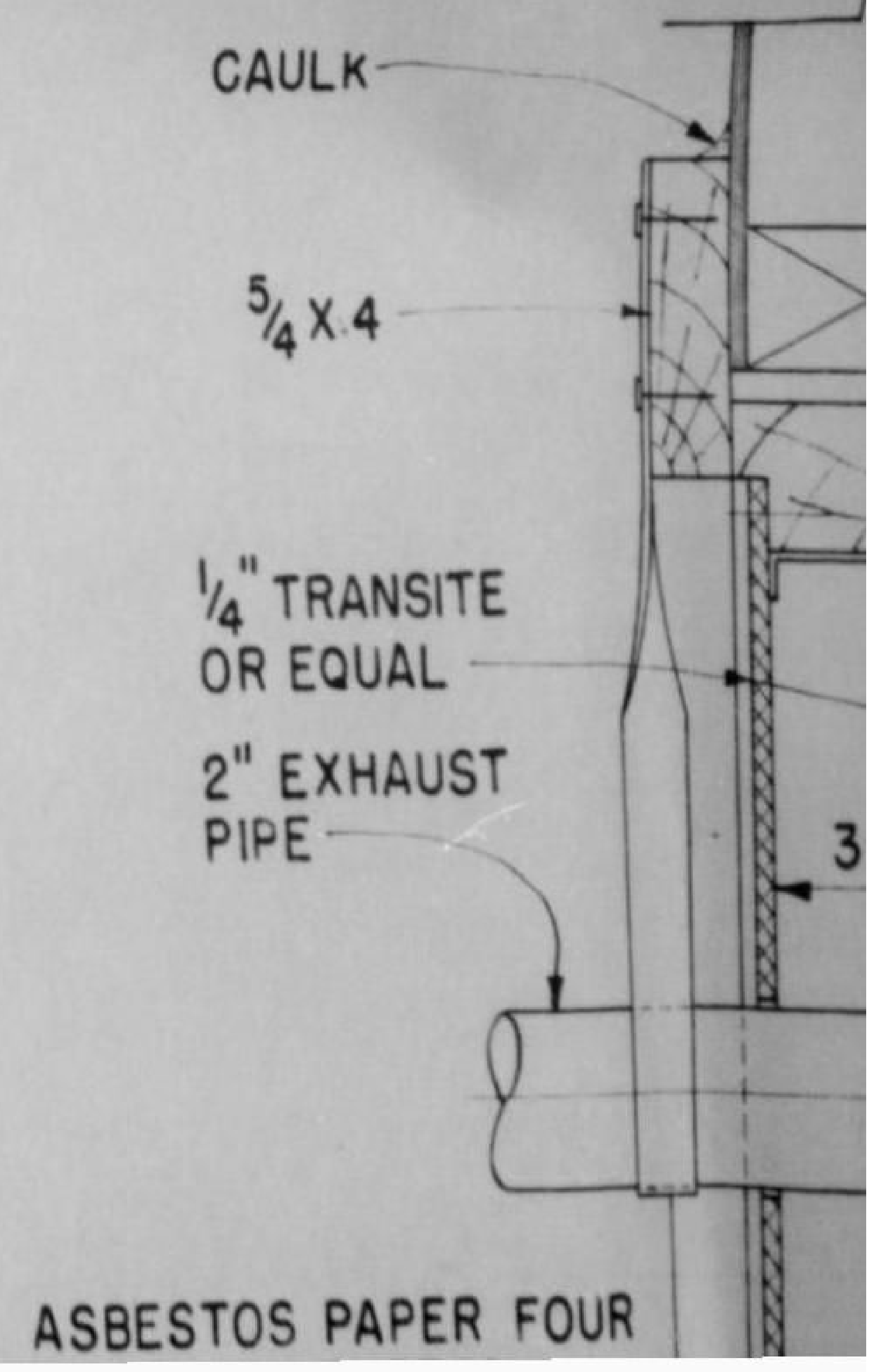


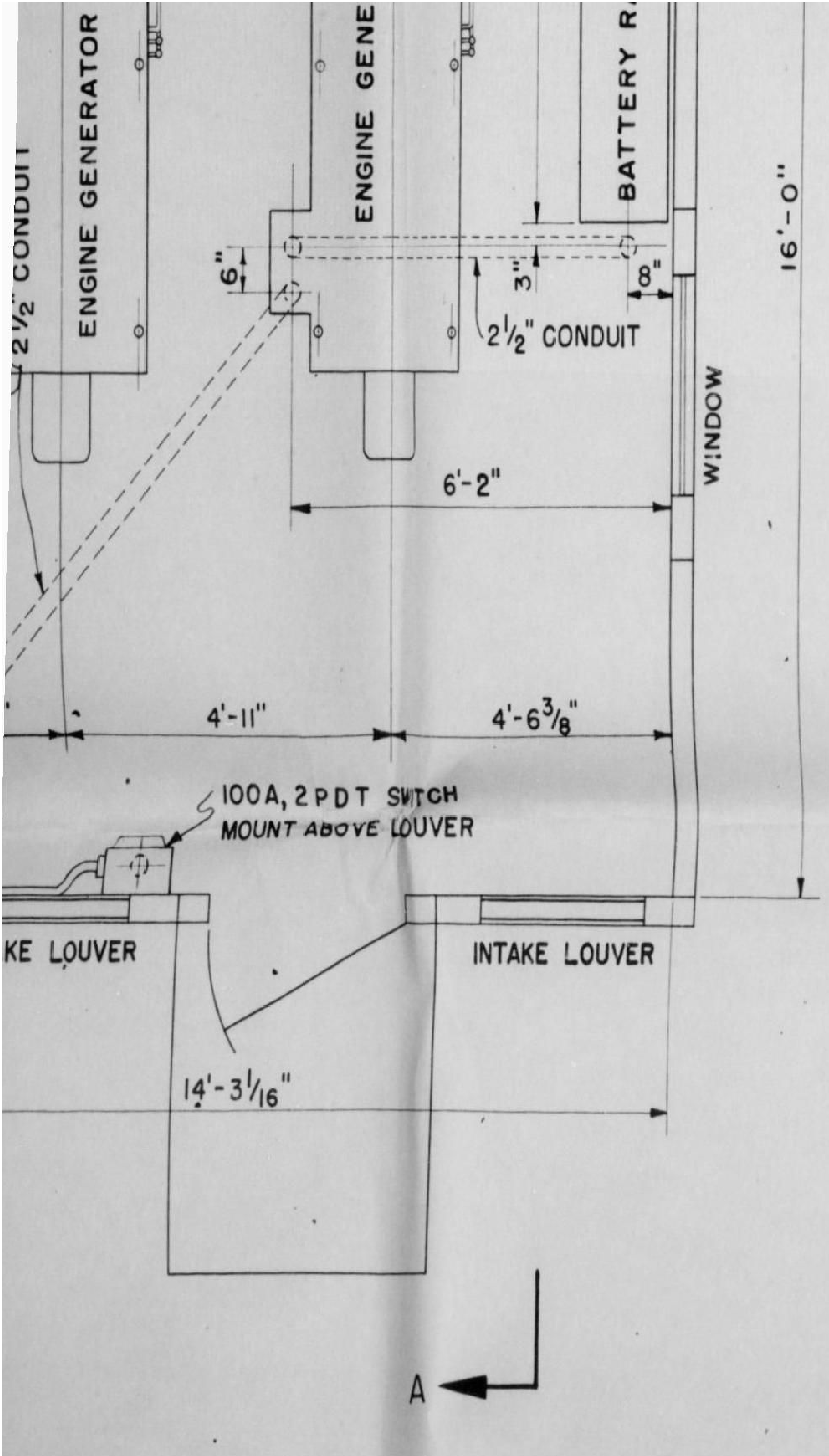
PLAN



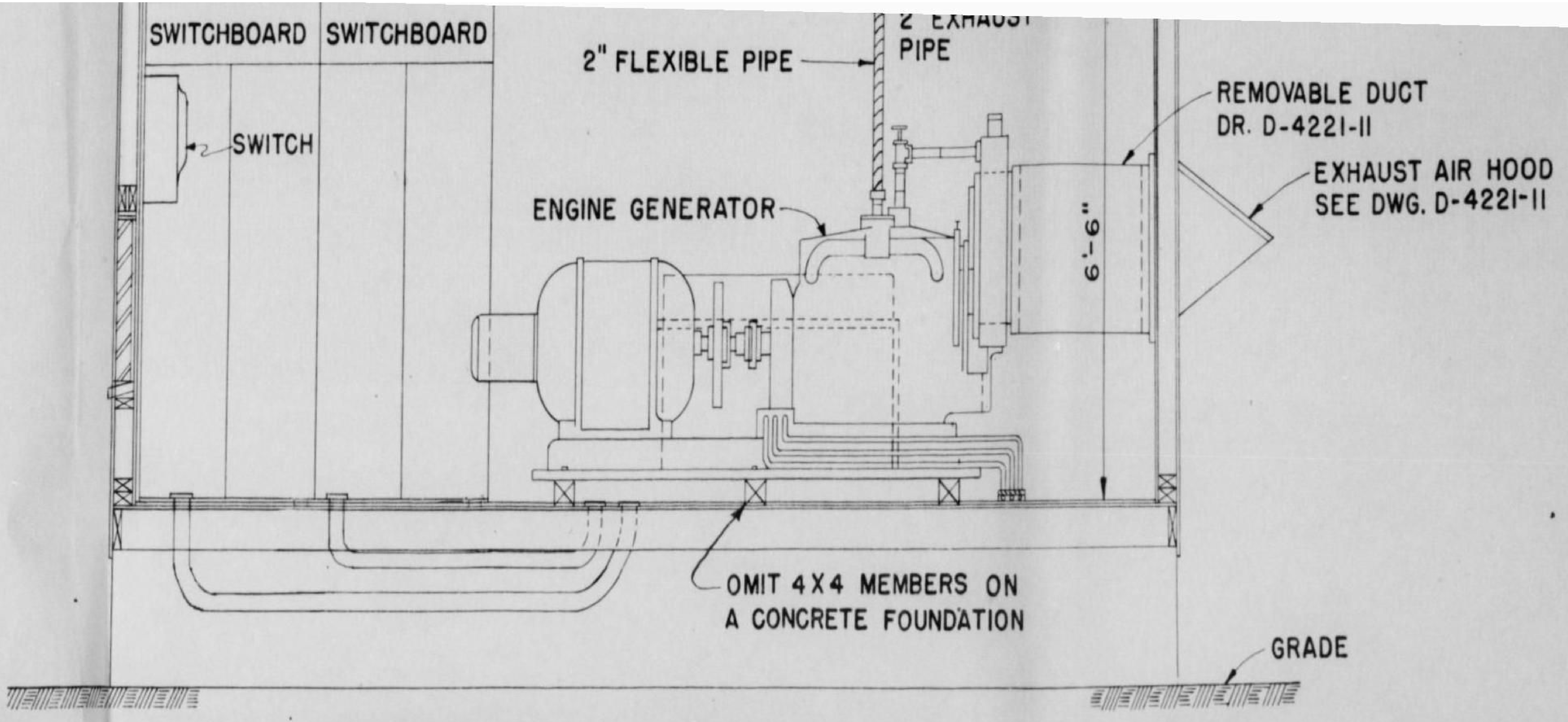
SECTION A-A



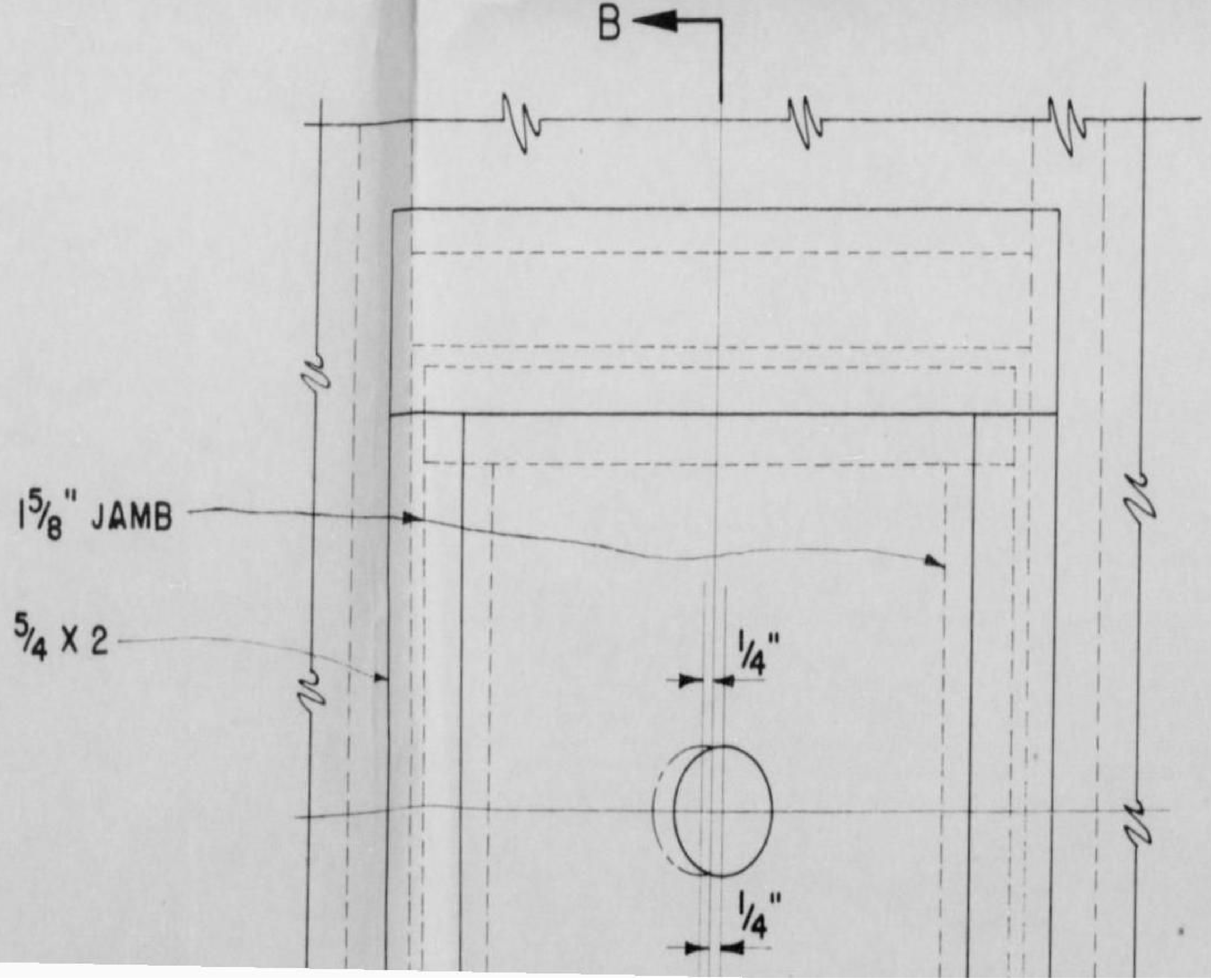


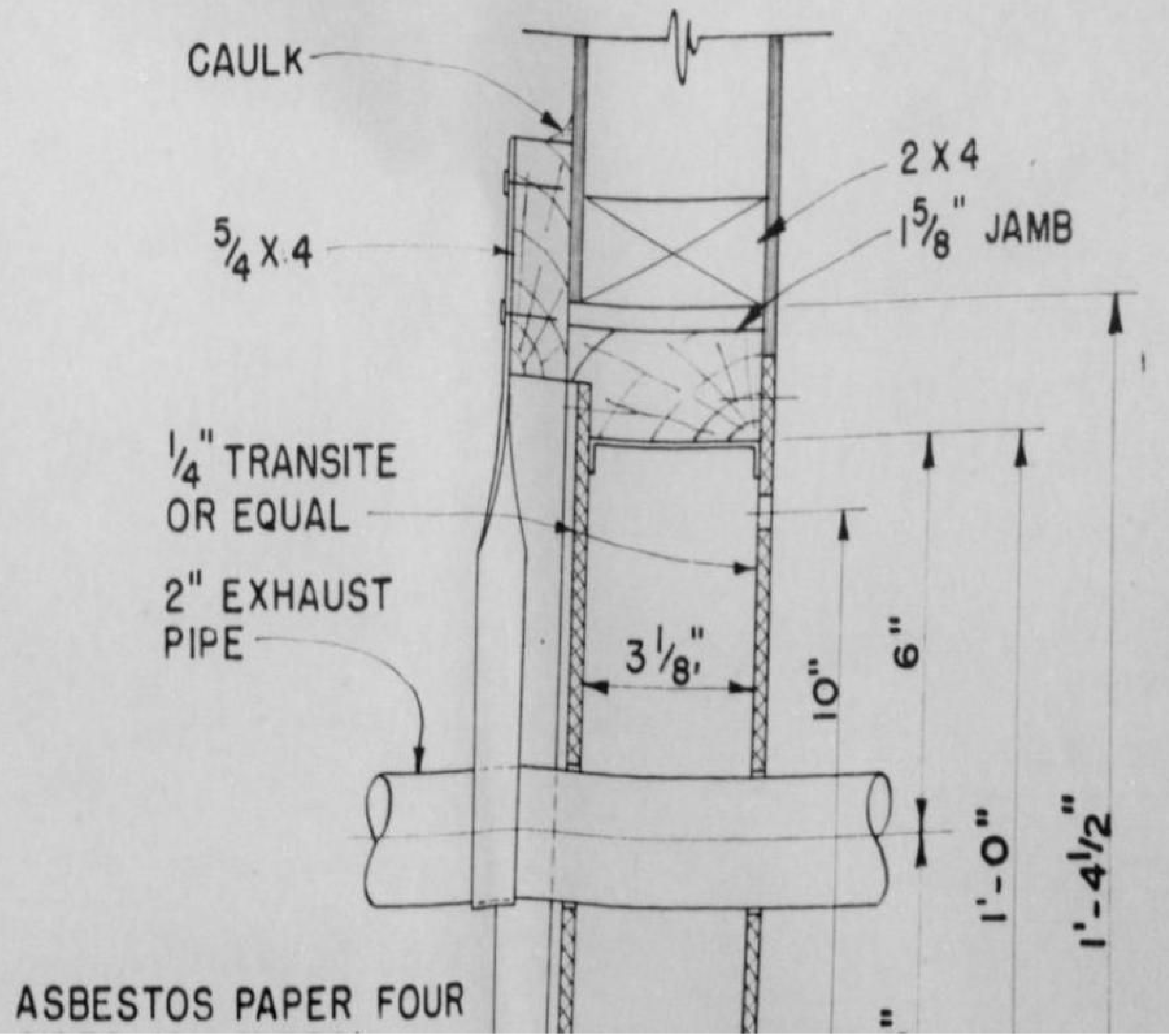


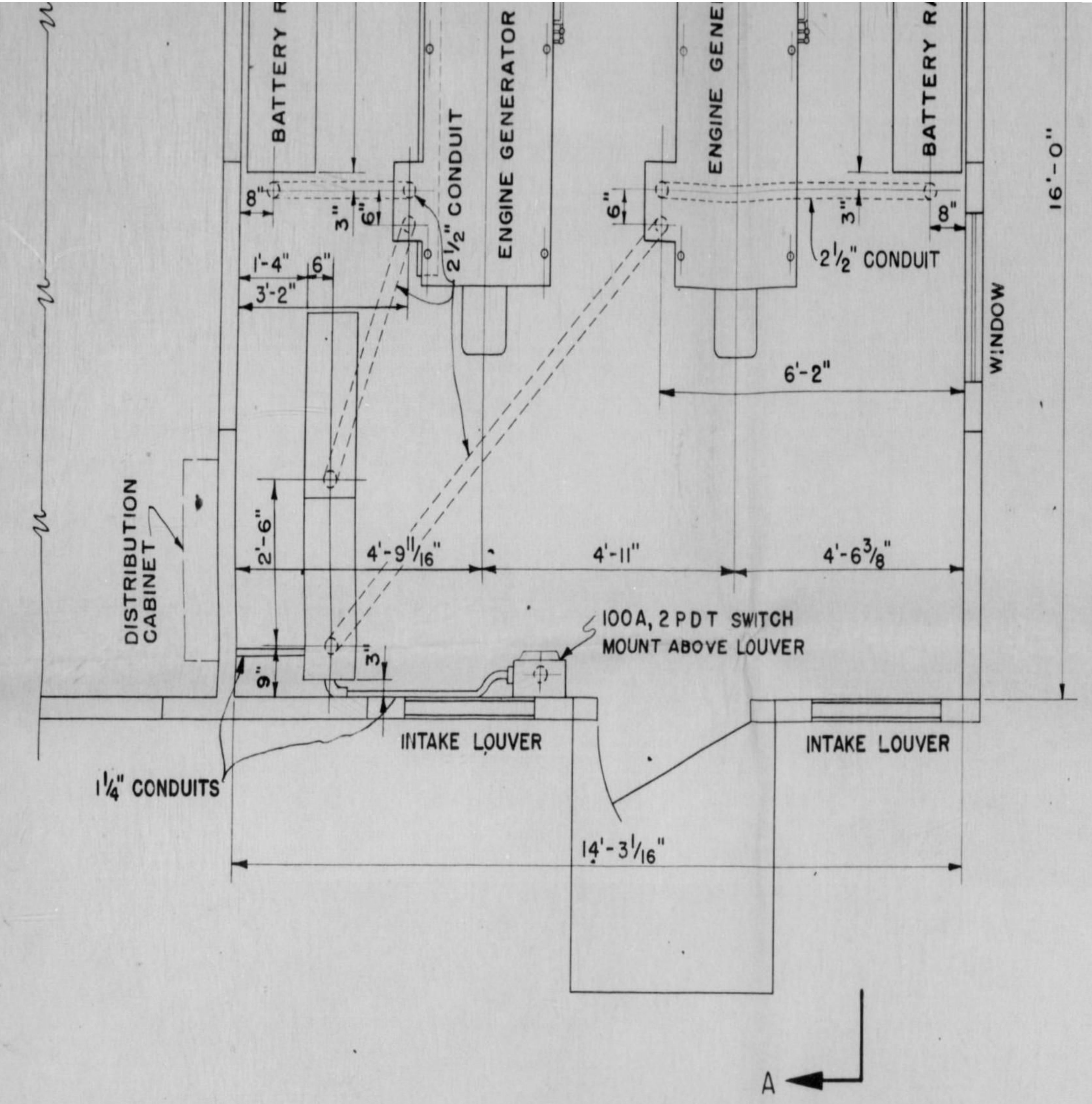
PLAN



SECTION A-A







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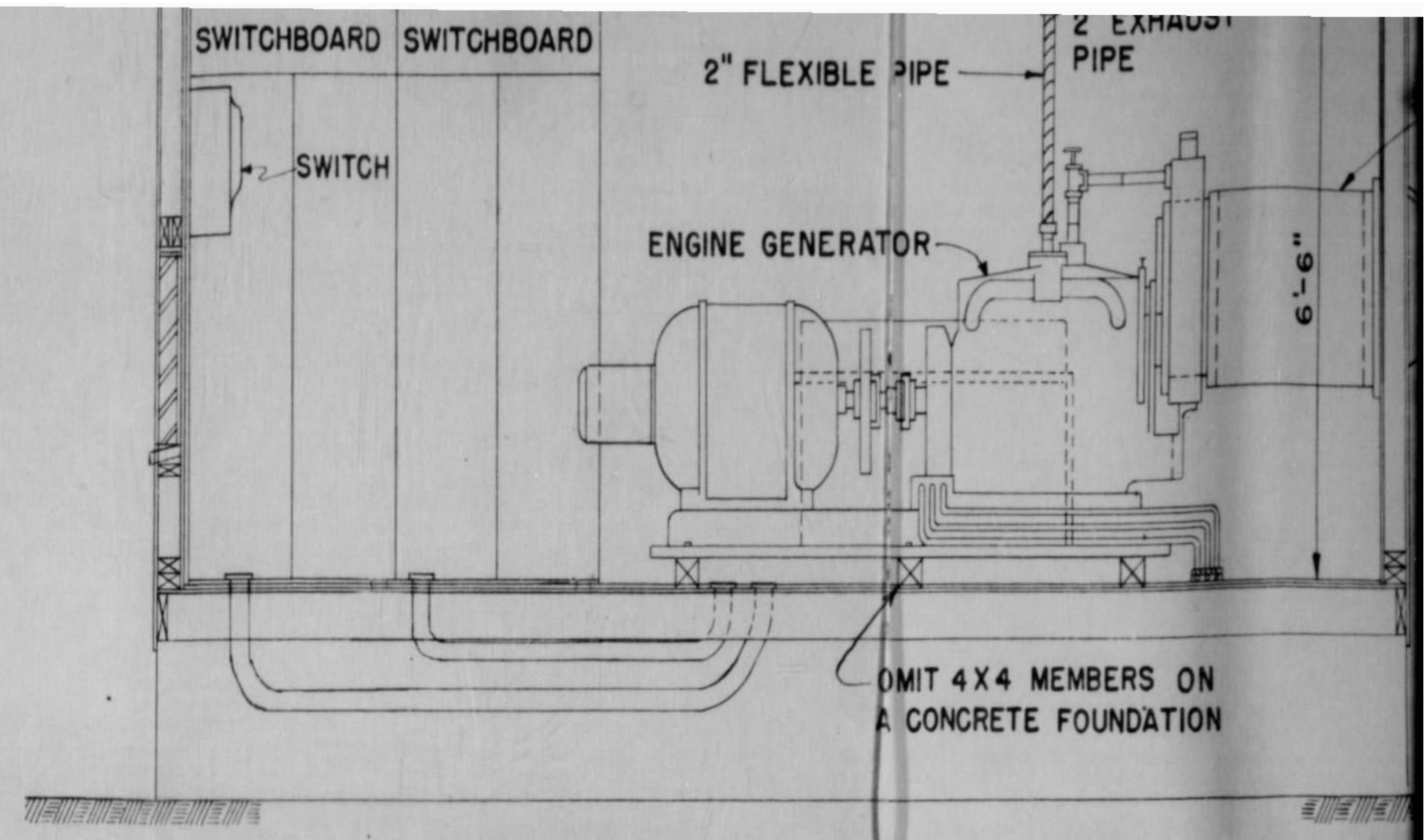
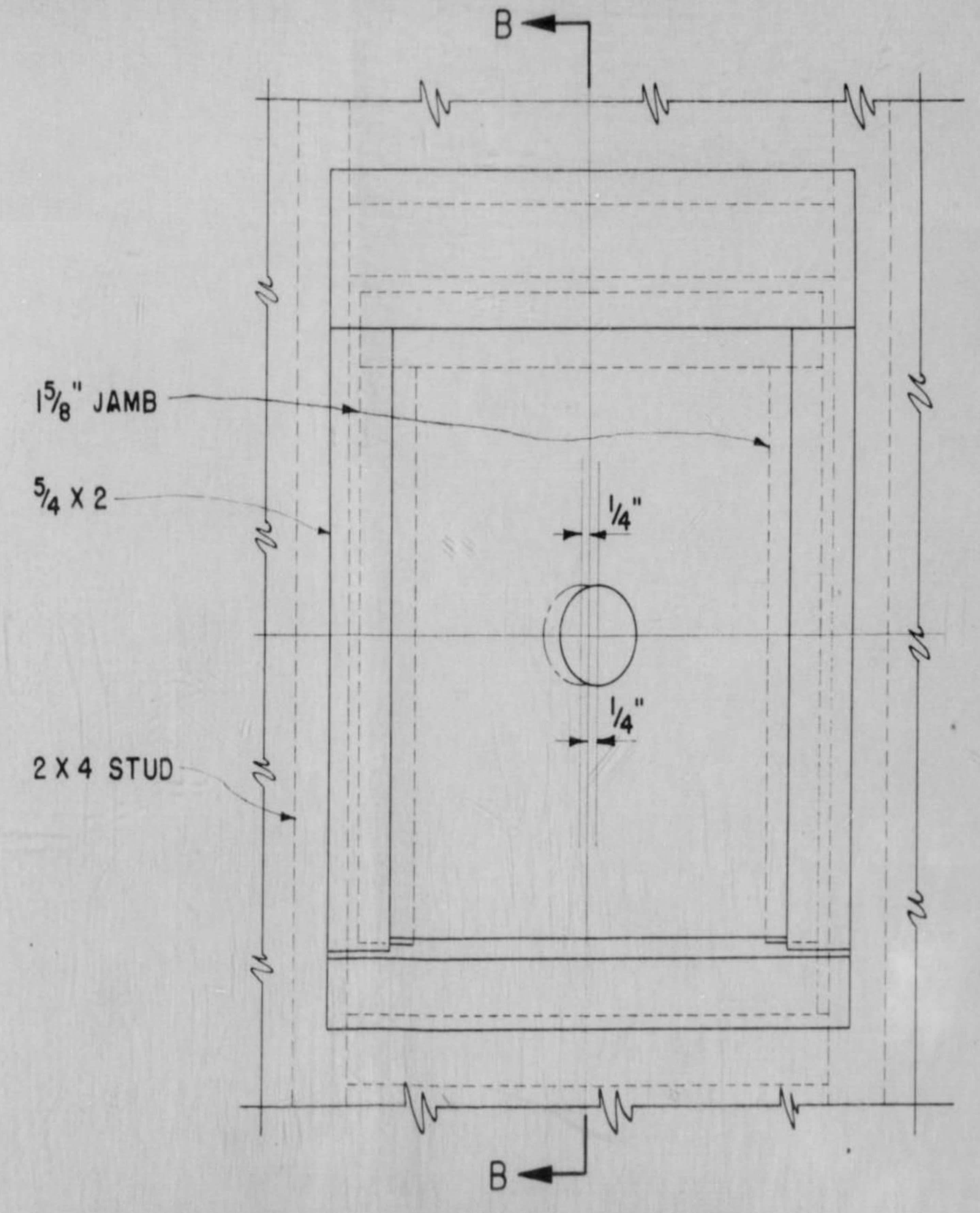
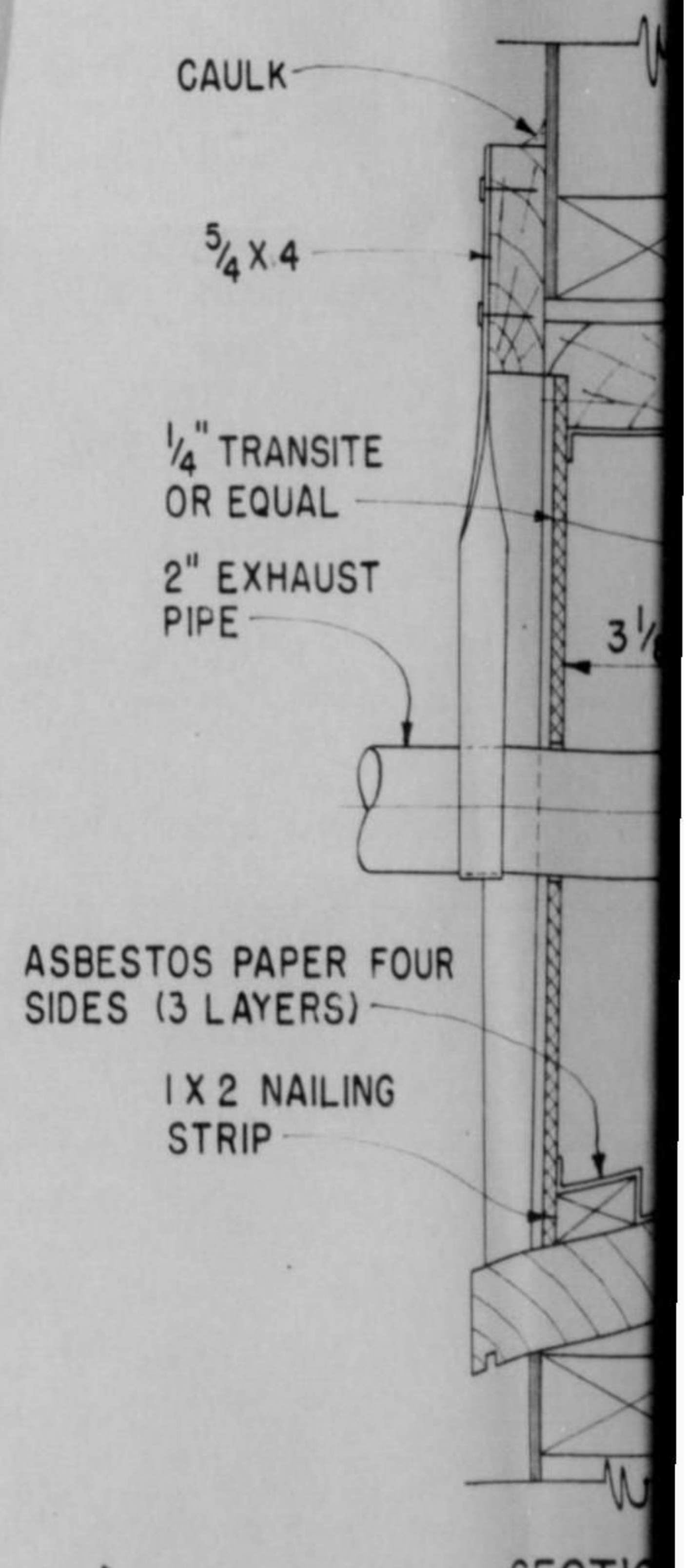


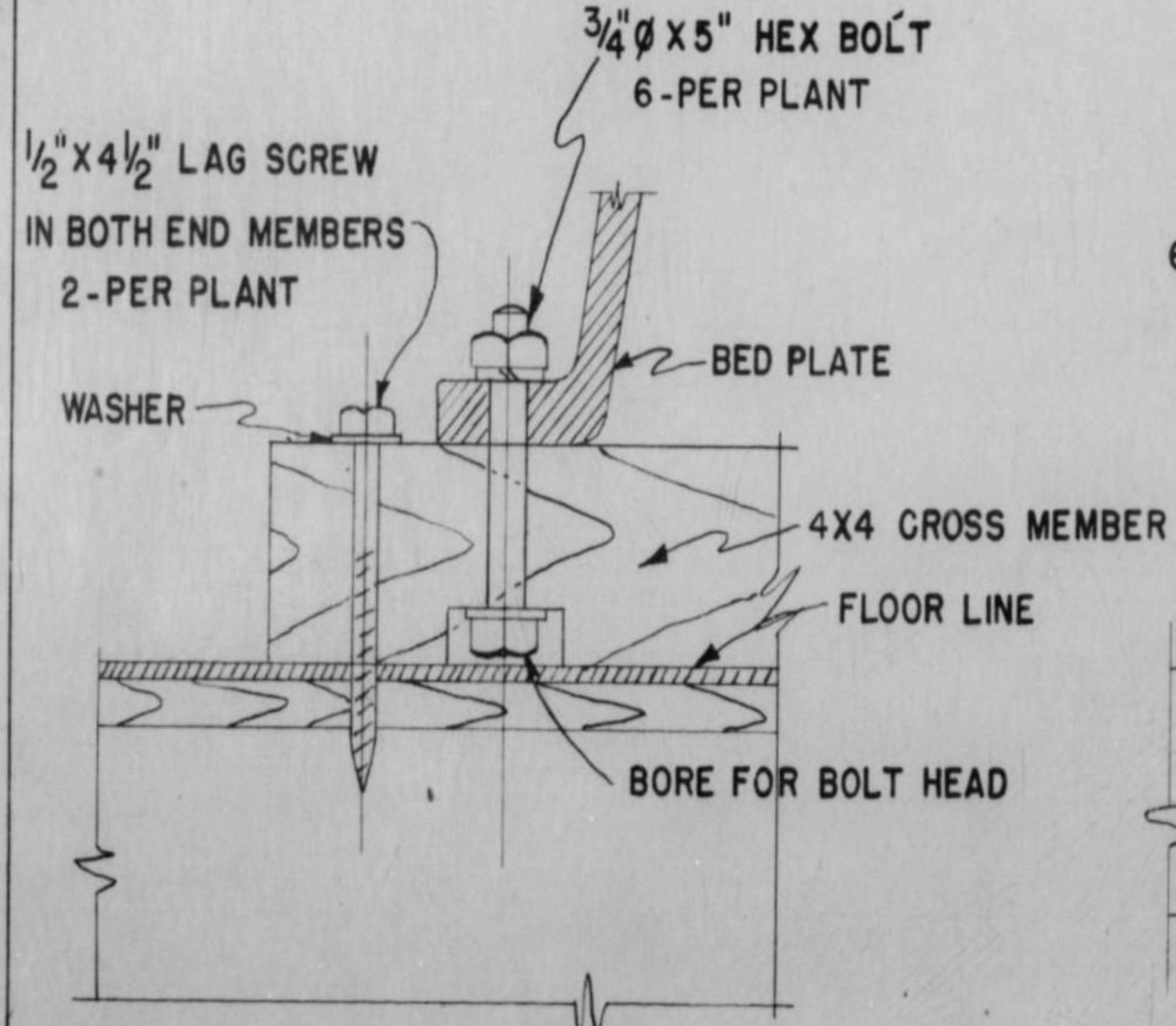
SECTION A-A



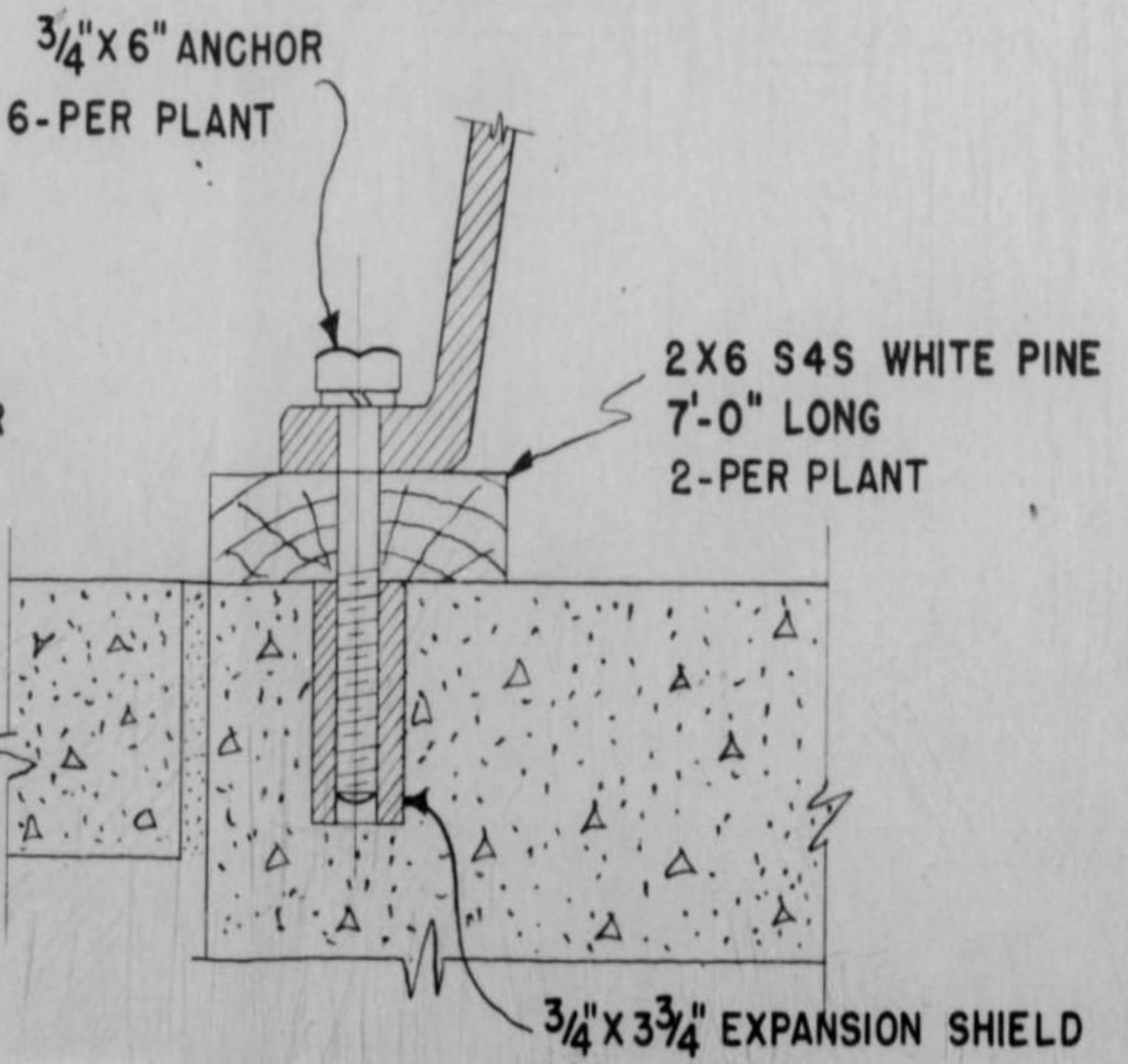
EXHAUST PIPE WALL ENTRANCE DETAIL



SECTI



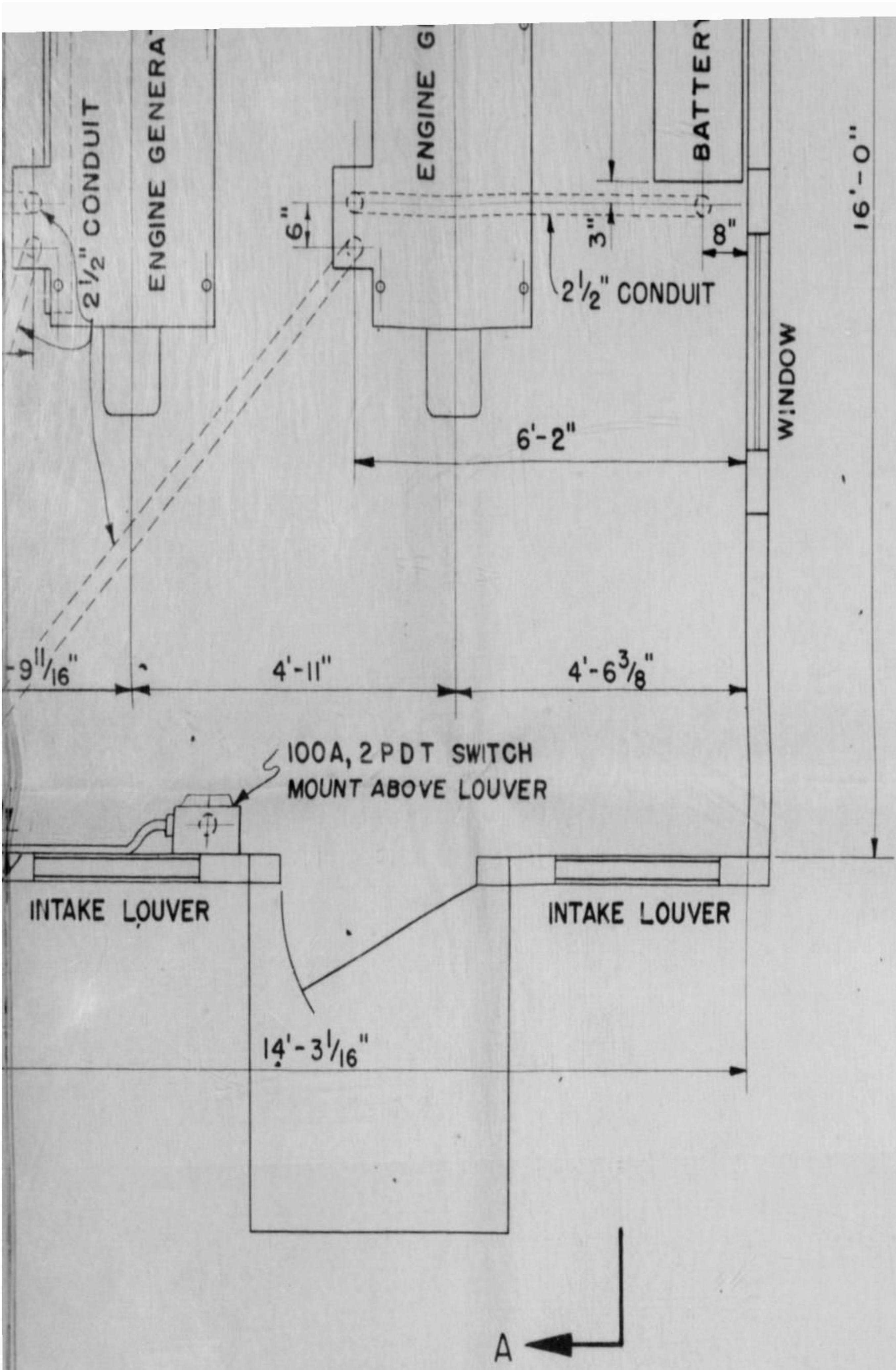
WOOD FLOOR ENGINE BOLTING DETAIL



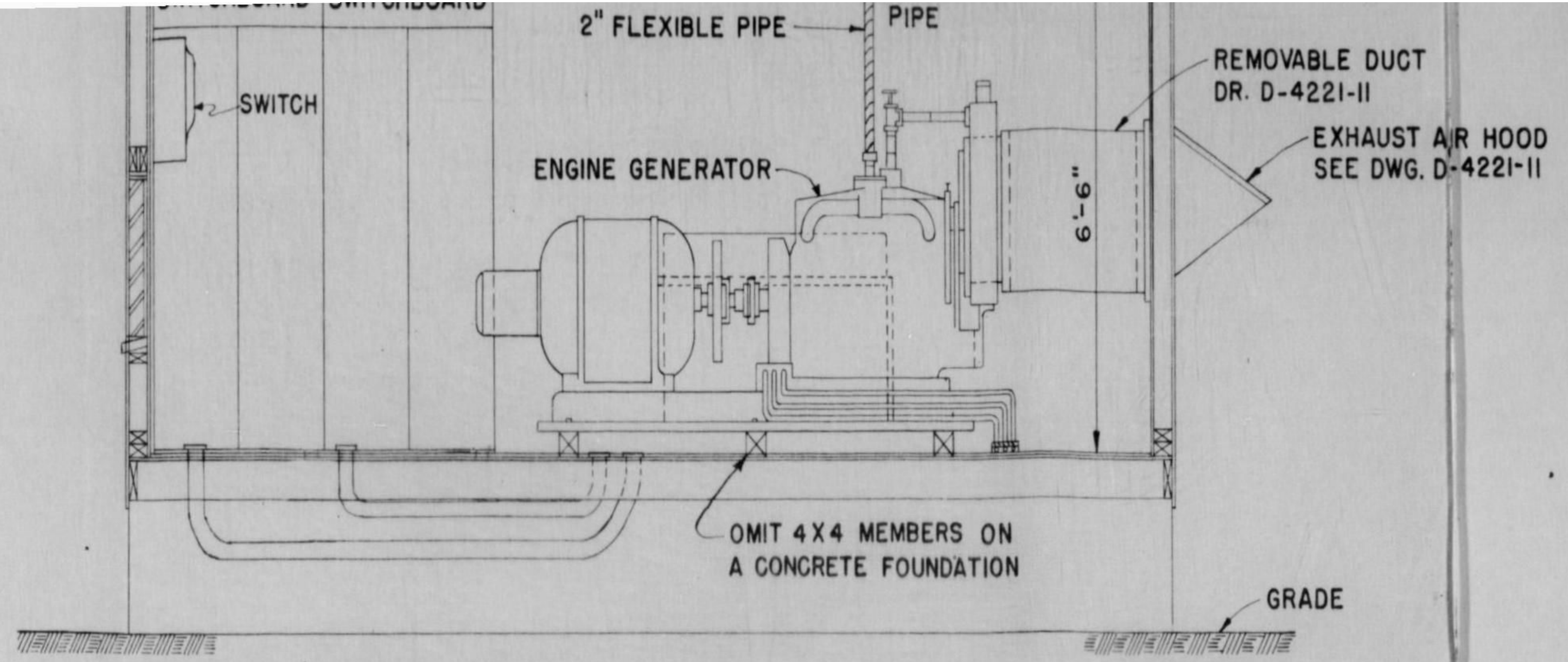
CONCRETE FOUNDATION ENGINE BOLTING DETAIL

SEE DWG. D-4223-4 FOR ENGINE FOUNDATION AND CONCRETE FLOOR CONSTRUCTION DETAILS

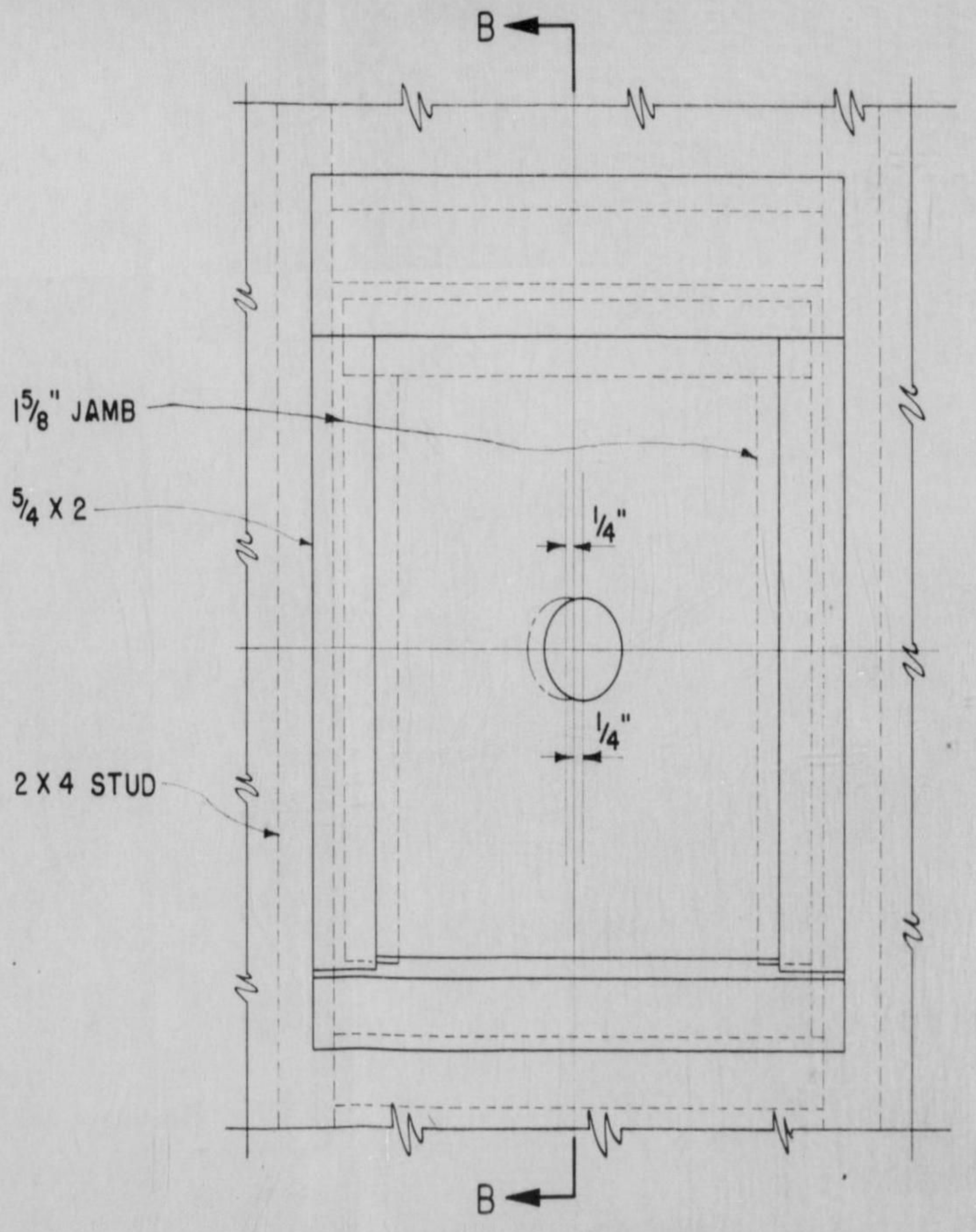
NO.	REVISION	DATE	CHECKED



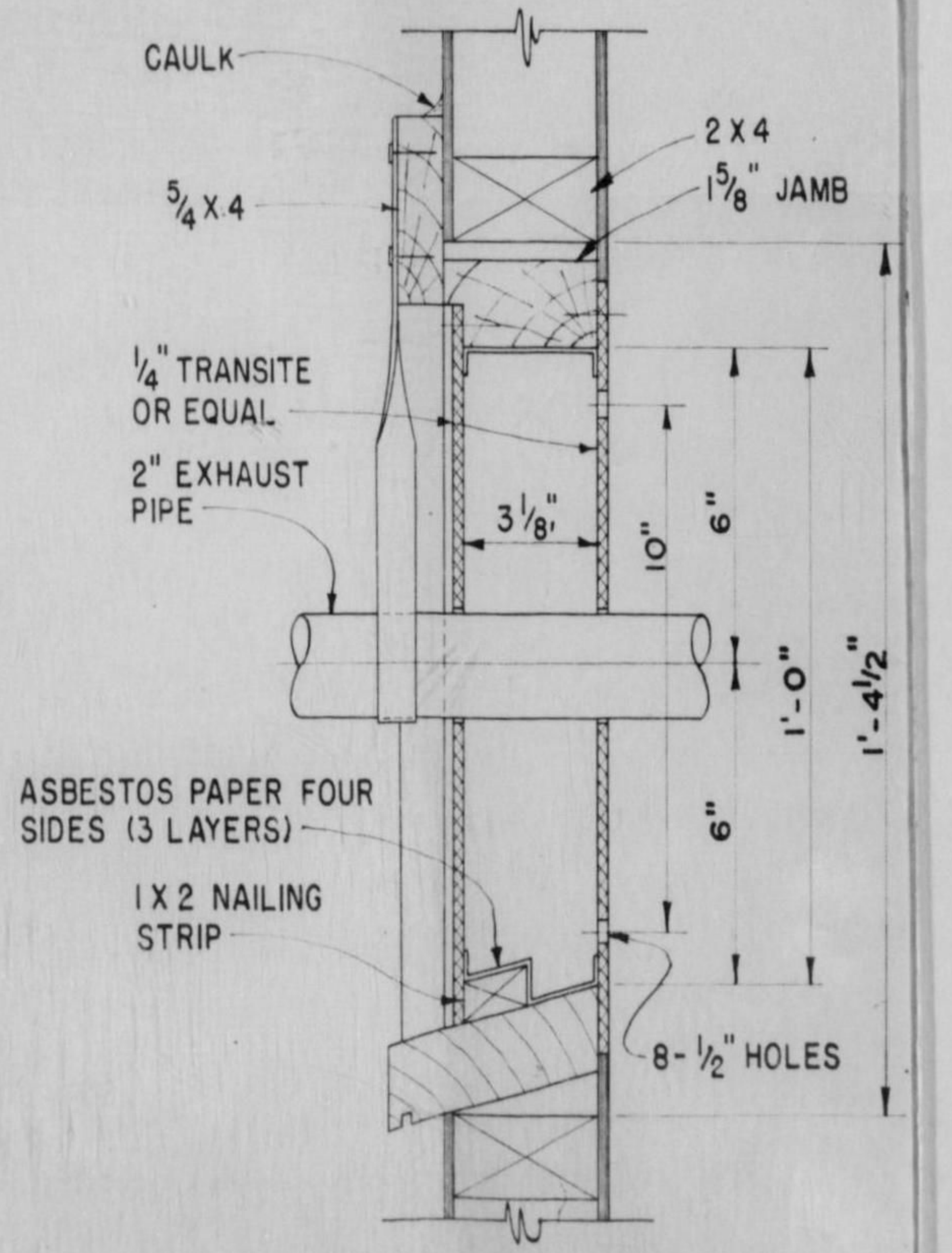
PLAN



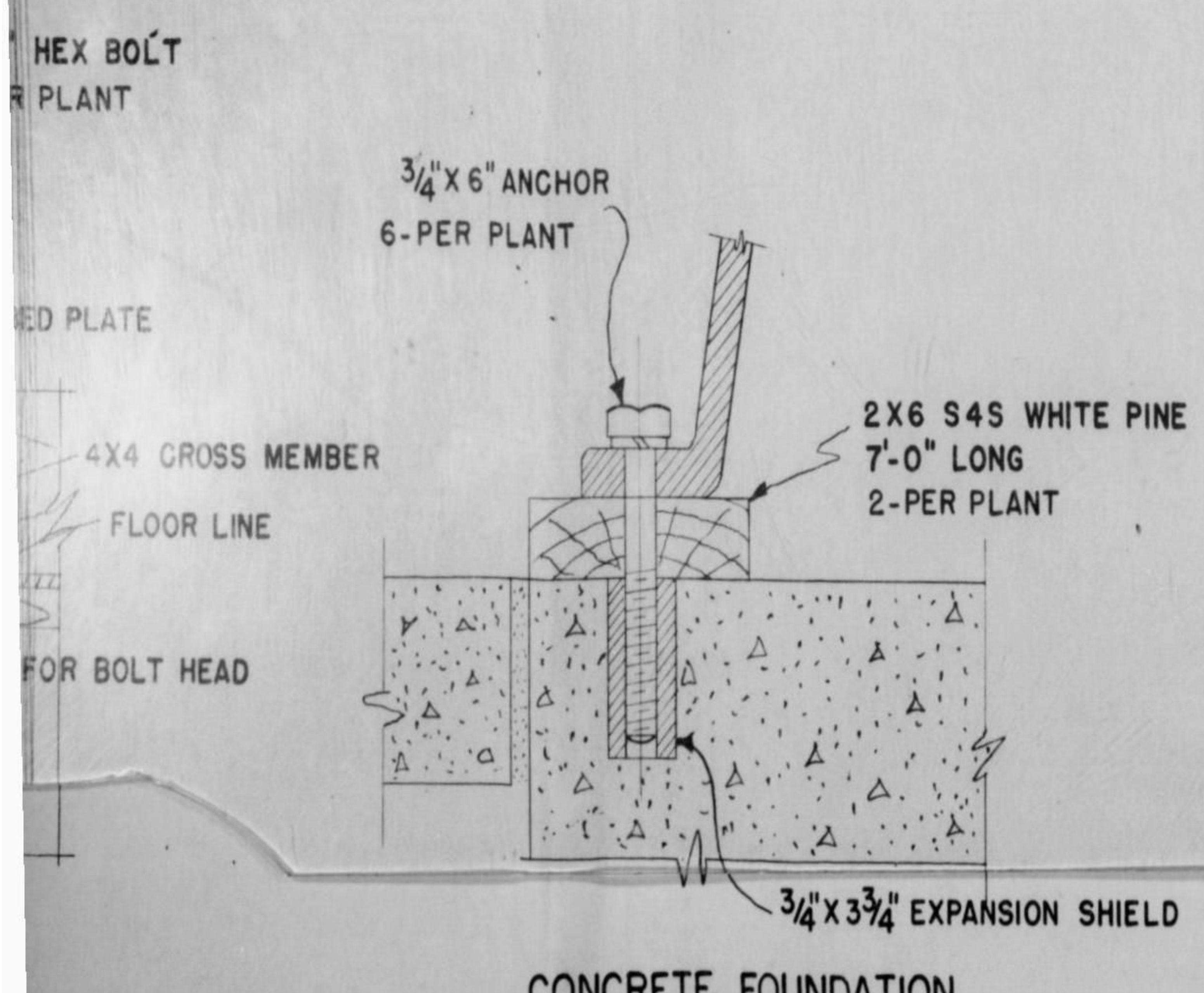
SECTION A-A



EXHAUST PIPE WALL ENTRANCE DETAIL



SECTION B-B



CONCRETE FOUNDATION
ENGINE BOLTING DETAIL

SEE DWG. D-4223-4 FOR ENGINE FOUNDATION
AND CONCRETE FLOOR CONSTRUCTION DETAILS

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS SERVICE

2-12.5 KVA ENGINE-GENERATOR
LAYOUT IN TYPE "DW" BLDG

NO.	REVISION	DATE	CHECKED

APPROVED: H. W. HOWARD
CHIEF: AIRWAYS ENGINEERING DIVISION
SUBMITTED BY: Hammond
CHIEF OF SECTION
CHECKED BY: R.T.B.
DRAWN BY: H. E. E.
DATE 12-11-42
DR. D-4233-1